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NINTH SESSION

ROME : APRIL 1922

GENERAL PROCEEDINGS

3rd Section : OPERATION

INAUGURAL MEETING

19 April 1922 (morning).

PROVISIONAL PRESIDENT, MR. COLSON,
MEMBER OF THE PERMANENT COMMISSION OF THE ASSOCIATION.

The President.—The Permanent Commission of the International Association has placed the preliminary arrangements of the third section in my hands. It suggests to you as :

President :

Mr. G. BEHRENS, director of the Midland Railway (member of the Permanent Commission);

As vice-presidents :

The Right Hon. Sir Evelyn CECIL, G. B. E., M. P. privy councillor, director of

the London & South Western Railway (member of the Permanent Commission);

Mr. C. HANREZ, director of the Belgian State Railways (member of the Permanent Commission);

Marquis de Alonso MARTINEZ, chairman of directors of the Northern Railways of Spain;

Dr. H. VAN MANEN, member of the Directorate of the Dutch Railways;

and as principal secretary :

M. BONNEVAY, chief engineer of opera-

tion of the Algerian Railways of the Paris-Lyons-Mediterranean Company.

(*Applause.*)

Has anyone any other proposition to make?

As there are no other candidates, the proposal which I have the honour to

make on behalf if the Permanent Commission of the Association is carried.

— The section, on the proposal of the president, then completed its secretariat, and provisionnally arranged the order in which the work should be carried out.

— The meeting concluded at 9.35 a. m.

[636 .211]

QUESTION IX

TERMINAL STATIONS FOR PASSENGERS

Arrangements for reducing the number of movements of locomotives and empty rolling stock at passenger terminal stations.

Preliminary documents.

1st report (countries using the English language), by Mr. A. S. BALDWIN. (See English edition of the *Bulletin* of October 1921, p. 1483, or separate issue [with red cover] No. 35.)

Supplement to the 1st report, by Mr. A. S. BALDWIN. (See English edition of the *Bulletin* of November 1921, p. 1927, or separate issue [with red cover] No. 35.)

2nd report (all countries, except those using the English language), by Mr. L. MACCALLINI. (See English edition of the *Bulletin* of March 1922, p. 553, or separate issue [with red cover] No. 62.)

Special reporter : Mr. L. MACCALLINI. (See English edition of the *Bulletin* of May-June 1922, p. 753.)

SECTIONAL DISCUSSION

Meeting held on 19 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — Gentlemen, I am very grateful to you for the confidence you have placed in me in appointing me president of the 3rd section. I will do my utmost to carry out my duties to your entire satisfaction.

As we are all business men, we will try to make our labours as productive as possible.

We will now deal with the discussion of question IX : Terminal stations for passengers. »

As Mr. Maccallini, special reporter on this question, is not here as yet, I will call upon Mr. Baldwin.

Mr. Baldwin, reporter. — As stated on page 4 of my report (¹), railway passenger services may be divided into two principal categories : Suburban service and main line service.

As regards terminal passenger stations, they may be classed from the point of view of the arrangement of the approach lines, of the platform lines and of the principal building, into one of the three following general types : stub, or dead end, stations, through stations, and loop stations.

One also meets with combinations of these three types, illustrations of these being given in my report.

On page 12 will be found a table giving certain stations with the number of approach lines, number of platform lines and the ratio of the platform lines to the approach lines.

On page 18 is another table giving the capacity of a certain number of terminal stations.

On pages 20 and 21 I have called attention to the capacity of stations, of the approach lines, etc.

On page 22 is a table giving the length of the platform lines in most of the terminal stations.

On page 26 is a table giving the curves and angles of crossings in use on the lines of a number of companies.

On page 27 the question of mail trains is dealt with.

Table VII gives data regarding the platforms of terminal stations.

Table VIII contains details of the methods of shunting.

(¹) See also the *Bulletin of the International Railway Association* for November 1931, p. 1927.

Table IX gives methods of turning rolling stock at principal stations.

Table X gives information on the handling of empty rolling stock between the stations and the storage sidings.

On page 40 I have pointed out that the electrification of a terminal station, as a means of reducing the movements of locomotives and empty stock, has given good results at certain stations where it has been adopted with this end in view.

On page 44 of my report will be found the following final summary :

1° Economies of operation will justify very considerable expenditures for the purpose of getting coach cleaning and engine facilities in close proximity to the passenger station.

In determining the location and arrangements for such facilities, in case of a new plant, careful estimates of operating costs should be made for all feasible locations, as capitalization of operating economies will frequently justify large capital expenditures.

In existing plants it is advisable to periodically compile accurate statistical data showing cost of various features of operation, as considerable expenditures are frequently justified for improvement of facilities;

2° It is important to arrange for movement of empty equipment from station tracks to coach and engine facilities with minimum interference of movement through the throat.

Expedition in such movements is afforded in approximately the following order :

- a) Loop terminals;
- b) Through terminals;
- c) Stub terminals;

3° A wye, preferably located between the station and the coach yard or otherwise at the nearest practicable location to the throat of the yard, will afford great economy in handling equipment;

4° Alternate trucking and passenger platforms will afford economy and convenience of operation in important stations, unless the handling of baggage, mail and express can be performed on that part of the platforms beyond the limit used by passengers, as is done in the loop station (fig. 7) or in the stub terminal (fig. 3) where all trains back in;

5° Coach cleaning and repair yards should preferably be sufficiently long to accommodate full length trains and be connected at both ends;

6° A flexible and adequate throat arrangement is essential to economical operation and full utilization of station tracks, particularly in the stub terminal;

7° Lead tracks paralleling the throat tracks and connecting engine, coach cleaning, baggage, mail and express facilities directly with a number of the station tracks, are of great assistance in relieving congestion at peak hours;

8° Arrangement of the various terminal facilities in their order of use so as to permit the proper sequence of operation with minimum back-up or interfering movements is of prime importance;

9° When practicable to do so, it is of great advantage to completely separate through passenger from suburban service;

10° Electrification may sometimes be used economically as a means of reducing movements and thereby increasing the capacity of a terminal where expansion by other methods is prohibitive on account of cost or physical difficulties. Due to the ability of electric locomotives to operate equally well in either direction, to the elimination of facilities for coaling, watering, removing cinders, and movements required therefore, and to the use of multiple unit equipment in

suburban service, electric propulsion has great advantages over steam.

The President. (In French.) — I will now call upon Mr. Maccallini, special reporter, who has been entrusted with making a resume of the two reports which have been prepared upon question IX.

Mr. Maccallini then read his special report which has been published in the April 1922 number of the *Bulletin*.

The President. — The resume which Mr. Maccallini has just read has not yet been distributed to all the members of the section, but it will be by tomorrow morning. You will receive at the same time the special reports summarising the subjects to be discussed at the ninth congress.

The discussion of each question will be adopted by the section in draft form before being submitted to the general meeting.

I propose to finish the discussion of question IX today, to consider the aforementioned draft tomorrow morning, and to then proceed with the discussion of question X. (*Carried unanimously.*)

Mr. Simon-Thomas, Dutch State Railways. (In French.) — Gentlemen, allow me to make a few remarks as regards Mr. Maccallini's very excellent report. I have been greatly interested in this, but I regret that only the plans of stub, or dead end, stations are reproduced in it, and one might therefore gain the impression that this type of station is the only solution for large passenger terminals. Nothing could be further from the truth.

On the other hand, Mr. Baldwin in his report has shown us modern through stations, such as the New York City Station on the Pennsylvania Railroad and the Central Station of Kansas City. This

method of constructing a passenger terminal station presents, without doubt, great advantages. While in the case of a stub, or dead end, station all the trains have to be drawn out to the storage sidings, the through station worked in both directions enables us to free the platform lines by continuous movement to the storage sidings situated at the other end of the station.

This continuous movement through the station will no doubt free the platform lines in the quickest possible manner, and this advantage is of the greatest importance as regards increasing the capacity of the station.

A method of working such as is carried out in the New York City Station on the Pennsylvania Railroad with storage sidings at Sunnyside certainly does not decrease the number of shunting operations, but these are reduced to a minimum. In fact, all movements are carried out at the storage sidings right away from the platform lines.

Thus, the through station certainly gives us one of the most practical solutions for traffic centres where a considerable proportion of the trains finish their journeys and have to be transferred from one line to another. This is not the case as regards the stub, or dead end, stations. It should not be overlooked that the Germans have stated that the construction of their famous Leipzig station is one of the greatest obstacles on their system.

If it is true that no station of great importance has been built in the last few years owing to the war, it is also true that the various administrations have not ceased to draw up new schemes.

Therefore, I am very sorry not to find in the reports mention of certain new schemes, for example, the Lille station of the French Nord and the Zurich station of the Swiss Federal Railways.

As regards the arrangements made with the object of securing the greatest freedom of movement for engines and empty stock, stub, or dead end, stations and through stations present difficulties, and methods of overcoming these are very different.

It goes without saying that a great deal depends, both from the point of view of the best arrangement of the storage sidings and also from the point of view of freedom of movement and safety, or whether stations are constructed with the arrival platform for each line immediately alongside the departure platform for the same line, or whether the arrival platforms for all the lines are situated side by side and separate from the departure platforms.

On this subject allow me to draw your attention to a very interesting discussion by Dr. Günther, engineer, published in the *Archiv für Eisenbahnenwesen*, 1920-1921.

As regards the question we are dealing with, I think that the steps to be taken with the object of reducing the number of movements of engines and empty stock constitute in the first place a problem of organisation in the make-up of the trains and the movement of through coaches from one line to another.

The most difficult problem to solve is that dealing with the arrangement of a lay-out which allows freedom of movement of engines and empty stock, and of trains, without impairing safety and without increasing the difficulties of interlocking points and signals.

The best position for storage sidings and engine sheds will depend in the first place on the situation and on the development of the traffic on the main lines. It is for this reason I think one should carefully consider each case and not follow too literally the third point

of the seventh paragraph in Mr. Maccallini's report :

“ Each of the sorting sidings must serve the greatest possible number of platform lines. ”

As regards the third paragraph “ the ordinary platform lines are the best fitted to reduce shunting to a minimum », I am not sure this is quite right, because if one tries to apply this system too rigidly and at the same time has regard to the safety of the shunting of engines and empty stock, the result will be a very large number of points and crossings, and as a consequence, very complicated interlocking. This programme, however, will not be rigidly adhered to, because separate storage sidings are not required at a central station for both inward and outward traffic.

For example, a line carrying through traffic will have much less need of storage sidings than a line where all the trains finish their journey.

However, common use of the platform lines is so important from the point of view of increasing the capacity of the station that I would wish to recommend this system, but only for platform lines which connect to main lines on which there is a frequent service.

Mr. Brisse, Eastern Railway, France. (In French.) — Gentlemen, the remarks which I am going to make are of a general nature and will I hope confine the discussion to the question of which we are really dealing with, that of terminal passenger stations.

What is really meant by a terminal passenger station? It may be a through station or a stub, or dead end, station, the fact which makes it a terminal station being the nature of the traffic with which it deals. We ought to limit ourselves to the discussion of stations which deal

with an important traffic which in one direction has its origin in the locality served by each of these stations, and in the other direction terminates in the locality of the station.

We have to examine what are the best methods to adopt in the organisation and working of a station which is called upon to have to deal with traffic which has its origin in the neighbouring district. Should we, in designing this station, adhere to the types which have been used for the most part up till now and which are known as stub, or dead end, stations, or should we on the other hand adopt by means of a device such as the American loop, the method of working that exists in through stations which deal with traffic which does not start or finish exclusively in the district served?

I think perhaps I should explain by means of a few examples what is in my mind.

Mention has been made of certain layouts which have been adopted in Central Europe and which have proved unsuccessful. There is for example the Leipzig station to which Mr. Simon-Thomas has alluded. This station is not my idea of the type of terminal station for very large towns where there is no connection between several railways.

The stations with which we have to deal are those such as one finds in the large towns; Rome, Paris, London and New York. They differ from those that we find at Zurich or at Leipzig, in that while having an important terminal traffic, they have also a very considerable through traffic, and have therefore to be arranged to suit these two needs.

The question, as put before us, deals principally with stations of the first category, that is in which very important traffic begins or finishes its journeys rather than with stations which deal with

a mixed service, as for example, Lille station, which ought to be equally suitable for an important through traffic.

The reason that this question has come up before the International Railway Association is that it is rather the question of the moment. In England, as in France and Italy, the traffic at the great towns with a daily influx of suburban travellers and of main line travellers coming to the large towns, forms a technical problem which is most important to solve.

Is the through or dead end station the best type which can be devised from a technical point of view, should not this rather be a combination of the two types? However, the question cannot be decided solely from a technical point of view; we cannot overlook the origin, the nature and the importance of the traffic dealt with in the station and the location of the same. The problem generally presents itself to railway officials in the following form : In large towns space is always very restricted, and it is therefore necessary to try to make the best use of this. There is only twenty-four hours in each day and often much less to deal with the traffic, and each hour has only sixty minutes and in many cases it is in a period of less than one hour that one has to provide for the arrival or departure of a rush of passengers amounting to tens of thousands.

It is necessary then that the time should be allotted as carefully as possible, and the problems which arise in terminal stations are not only questions of lay-out, but questions of time, in which minutes and quarter minutes might have a great importance by reason of their cumulative effects, and the necessity for handling the traffic in the time which is available.

We must therefore consider the ques-

tion from this point of view without losing sight either of the importance of the traffic to be dealt with or of the short spaces of time in which the operations have to be carried out.

Mr. Maccallini, special reporter. (In French.) — Allow me to point out to Mr. Simon-Thomas and to Mr. Brisse that the question as put before the Association only deals with shunting in terminal stations. We have not time to discuss here (although it may be a very interesting topic) whether we ought to choose the through station or the stub, or dead end, station; there are very many other considerations, especially those of a local nature, which affect this question.

The point we have to consider is the arrangements to be adopted in order to reduce the number of movements of engines and empty stock both in through stations or in stub, or dead end, stations, because under the heading, terminal stations, one has to deal with both these types. It is obvious that a through station, or a loop station, is the ideal solution as regards reducing the number of movements, and that a stub, or dead end, station presents greater difficulties in this respect, and this is the reason why Mr. Simon-Thomas finds that stub, or dead end, stations are specially dealt with in my report.

As regards the arrangement of the Lille station, I would point out to Mr. Simon-Thomas that if I have not included this in my report, it is because the Nord of France Railway Company has not sent me this information.

Mr. Moutier, Nord Railway, France. (In French.) — I am surprised that you have had no information as regards the Lille station. The reason is, however, that the plan of the new station is still under consideration, and we have only been able to give definite information on

this subject in the course of the last few days. It is only recently that we have been able to come to a decision as regards the general scheme, and it was difficult therefore to give any information to the reporter at the time he asked for this some months ago. I will say a few words on the question when the President calls upon me.

Mr. Sabouret, Paris-Orleans Railway. (In French.) — Certain arrangements have been adopted at the Paris station (Quai d'Orsay) to overcome some of the inconveniences of a stub, or dead end, station as regards freeing engines, and these arrangements have not been mentioned in the report. Perhaps I may be allowed to make a few remarks on this.

This station is a dead end station on two levels. The large departure and arrival halls are built on the level of the neighbouring streets and are above the platform lines. The whole lay-out has been arranged as if the station were going eventually to be transformed into a through station. The departure and arrival lines, ten in number, are served by five platforms each of which connects to the storey above by means of lifts and staircases, which obviates the necessity of joining the five platforms by an end platform. In the space which is thus left free, an electric traverser has been installed by means of which engines can be freed by using any one of the platform lines.

The station has not only ten dead end lines, but has also four storage lines which extend somewhat further. All these lines are crossed on the level without any gap in the rails by the traverser, which was made in the first place for 50 t. engines and which serves at the present time, with a few alterations, for very short engines of 87 t.

Mr. Maccallini. (In French.) — Mr. Sabouret's remarks are interesting. We have kept this in mind in our report, as we state in the final summary that : « Stations in which the spaces at the ends of platforms are not required for the convenience of passengers are the best for equipping with apparatus for liberating engines which arrive with trains at dead end stations. »

Mr. Brisse. (In French.) — The traverser in the Quai d'Orsay station is not merely a substitute for a crossing, it is a transporter which connects all the lines in the station and allows the engine of a train that has come in on any line to be liberated on any other.

Mr. Maccallini. (In French.) — This arrangement should be borne in mind. I have alluded to traversers in my report.

Mr. Maison, Ministry of Public Works, France. (In French.) — Gentlemen, it appears to me, from the report of the two Reporters, that the question of terminal stations has been dealt with on the assumption that it is always possible to buy the necessary land required for a station at a reasonable price, or in other words, as if their extension or alteration was not entirely a matter of money. The question, however, of terminal stations, in a large town such as Paris, is quite a different matter, because stations of this sort are hemmed in a space which prevents their being extended, the result is that the arrangement to be adopted in these stations for the most efficient working cannot be always the same, as those which appear to be recommended in the majority of the conclusions arrived at.

In practice, the tendency which seems to be most marked at the present day is that which consists in removing as far as possible from terminal stations the features which are not directly required

for dealing with the passengers, such as engine sheds, empty stock, sidings, etc.

We should therefore, before proceeding with the discussion, make some reservations on the first paragraph of Mr. Baldwin, and on the seventh of Mr. Maccallini.

Mr. Maccallini. (In French.) — Mr. Maison's remarks are quite to the point. Allow me, however, to point out to our honoured colleague that one must differentiate between new stations and those already in use.

As we have said in our report, we have pointed out the general principles which in our opinion should be followed in laying out terminal passenger stations and in their working with a view to reducing as far as possible movement of empty stock and engines, though it must be understood that this is where local conditions and particular circumstances do not prevent any difficulties.

There is no doubt that for some stations it is necessary to put some of the necessary adjuncts at a distance from the station itself. It is none the less true, however, that placing the storage sidings close to the terminal station has the effect of reducing the number of movements.

Mr. Maison. (In French.) — While quite recognising the importance of Mr. Maccallini's remarks, I should say that when I heard new lay-outs at terminal stations mentioned, I did not think one was dealing with the question of a new terminal station. If it is a question of the construction of a new station of this sort at a large town, I would ask if the possibilities of such construction has been considered. This is the reason why I thought we were only dealing with the extension of existing large stations.

I would add that as regards these

stations the problem presents itself in a very different way in different towns. Great difficulty in enlarging terminal stations is met with at the present time, and the matter will be still more difficult in the future, in view of the ever increasing requirements.

Mr. Crimail, Ministry of Communications, China. (In French.) — I would like to know the reasons which led to the Italian Railway Administration deciding to construct a stub, or dead end, station at Milan in place of the existing through station.

Mr. Maccallini. (In French.) — This decision was taken I believe because of the great advantage gained in having a terminal station in the centre of the town, whereas to have built a large through station would have necessitated having to move it further away.

Mr. Crimail. (In French.) — Will the existing station be retained?

Mr. Maccallini. (In French.) — It may perhaps be used for special traffic.

Mr. Payet, French State Railway. (In French.) — The question raised by Mr. Maison is of particular importance to the French State Railway, especially as regards the Montparnasse station, in which case we have had to remove some of the necessary adjuncts outside Paris.

It is impossible to enlarge this station on its existing site and retain the sheds, etc. The conclusion on this point should not be absolute, as there may be local conditions which make it absolutely necessary to remove to a distance some of the outstanding features.

On another point I should like to ask a question of the Italian reporter. What will be the advantage of the two stations at Milan where there is at the present time a through station? This is a

very interesting example which contradicts, it seems to me, the principle expressed in the final summary of the report.

Mr. A. Davies, Lancashire & Yorkshire Railway, Great Britain. — For what reasons did the Italian Railways decide to build a dead end station at Milan in place of the present through station?

Mr. Vigna, Italian State Railways. (In Italian.) — As regards the remarks that has just been made that at Milan a terminal station is being constructed in order to supersede a through station, one cannot reply to this without taking into consideration the railway problem at Milan as a whole.

However, confining our attention to the new passenger station, one should not overlook the fact that this town has grown very rapidly and there is no space available in the centre of the city which would allow of increasing the present passenger station, which is already surrounded on all sides by houses which have been built round it. It would therefore be necessary to place a new through station at a very great distance from the centre of the town, besides running the risk of seeing the same difficulties that we now have, again arise in a few years time.

Moreover, the Milan suburban service is very important, because it serves the centre of a highly industrial and commercial district, and has to provide for the transport each day of many thousands of workmen from the suburbs to the town, and *vice versa*.

The through passenger service is no less important, the town being placed on the main lines of Turin-Trieste; Chiasso-Domodossola; Genova, Bologna and Rome. We have therefore to deal with varying and complex conditions, at the same time

remembering that the population, which is accustomed from time immemorial to have the station in the centre of the town, would object to the inconvenience of a station situated a considerable distance away. A station has thus been selected which best fulfils the requirements of the population, and this has been built only 600 m. (650 yards) behind the existing station.

Of course, one has not failed to use all the resources of railway technical knowledge, as for example, the complete separation of passenger lines from goods lines and of the accommodation for these classes of traffic, the location of junctions at about 3 km. (1.9 miles) from the actual station, the raising of the level of the track and the location of all the offices and parcels and postal depots at a lower level than that of the station, the placing of the engine shed and passenger stock sidings outside the station, connecting these by independent lines.

In conclusion, while it is evident that the two types of station have their advantages and disadvantages, one cannot arrive at an absolute decision *a priori*; it should be done after considering the local conditions of the passenger services which have to be handled. As regards Milan, it must be specially noted that it is essential to maintain contact with the centre of the town and thus fall in as far as possible with important local interests and that the suburban and main line services are both very important and developing rapidly. One must also consider the lack of necessary space.

Mr. Payet. (In French.) — Mr. Macallini gives me to understand that at Milan the existing station will be worked at the same time as the new one. Why then construct a new station since the two stations deal with the same through trains?

Mr. Vigna has just informed me that the new station will replace the old one.

I should like to know why the railway authorities have modified their original project and have adopted another solution which consists of replacing a through station by a terminal station.

Mr. Vigna. (In Italian.) — It is the increase in the traffic which has obliged us to build a new stub, or dead end, station which will not be far from the town.

As regards the existing station, it will be done away with and we shall have only one terminal station.

Mr. Maison. (In French.) — Will the new station be built far from the existing station?

Mr. Vigna. (In French.) — The position of the new station where we have the necessary space is about 600 m. (650 yards) from the existing station. The plans are ready and have received careful consideration.

Mr. Brisse. (In French.) — We are getting rather away from the point. The question as put by the Permanent Commission deals with the general organisation of stations, or rather of large stations which serve very large towns. We have seen for example a change of opinion on the part of the Italian State Railways as regards the central station at Milan, and it is this which is the important point.

Can a very important urban traffic be dealt with by a through station? To this question I would certainly answer in the negative. Urban traffic consists of two principal elements; the daily traffic, suburban traffic strictly speaking, consisting of travellers who live outside the town in which they have their daily occupation, and holiday traffic consisting of residents who leave

the town to spend the day in the outskirts or in the country.

As regards these types of traffic, we cannot find better examples than in London. In spite of the development of means of interurban communication, and in spite of underground and surface railways and the development of electric and other forms of tramways, the need of the travelling public is to be able to get out into the towns and districts surrounding the city.

This leads me to ask another question to throw light on the discussion on the Milan station: Do our English colleagues anticipate the possibility of removing Liverpool Street station and replacing it in the suburbs of London? (*Cries of dissent from the English delegates.*)

We have here a very good example in which the influence of the traffic handled makes itself felt on the organisation devised to meet it.

As regards Milan, we are probably considering a complicated situation. There is the local traffic, which can no doubt more easily make its wants felt; since the long distance traveller who arrives or departs from Milan does not attach so much importance to being able to enter or leave easily the town as does the suburban traveller. It may therefore be considered, for this reason, that the choice between a terminal station and a through station is rather an open matter.

I would mention in passing, that for main line traffic, consideration must be given to the handling of luggage which is carried in the same trains as the passengers. There is no doubt that a stub, or dead end, station presents very real advantages in this respect.

A central through station for main line traffic was tried years ago in Berlin. An attempt was made to centralise the ever growing main line traffic in the Frie-

drichstrasse station. At the commencement everything went well, but after a few years the railways one after the other removed their main line traffic to the stub, or dead end, stations in that Capital, and only maintained a very reduced service in the afore mentioned station. In addition to terminal stations, there is the question of connecting stations, of which Leipzig may be taken as an example.

The central countries of Europe where, from the first, the connecting points between different railways have been established close to urban centres in one and the same station, have naturally tried to retain for the travelling public the advantages arising therefrom. Thus, the different railway administrations of central Europe have made a principle of providing a central connecting station for the important lines. The first station of this type which was established in Europe was that of Frankfort and has proved satisfactory because it was on a fairly small scale. This cannot be said of the Leipzig station which is very large.

From this point of view, with due regard to the habits of travellers in central Europe, I think that the through station offers greater advantages than a stub, or dead end, station, at any rate when the latter is of some considerable size. This is a problem that one has not had to cope with, either in the case of Paris or London. At one time, however, there was much discussion on the subject of making a central station at Paris, where the different railways running into that town might connect. Fortunately this project has not been put into execution, because insuperable difficulties were encountered.

For very large towns, one must be content with the methods of inter-railway connection with which we are acquainted : metropolitan railways, tramways and cabs. In towns of lesser importance which are served by a number of railways, it does not appear wise to adopt stub, or dead end, stations for trains which connect with one another. A through station is a better solution, although the former presents advantages from the point of view of handling luggage, and this is one reason why some railways are already considering building stations on two levels so as to retain this advantage and at the same time realise some of the advantages which are offered by a through station as regards movement of stock in a terminus.

Mr. Sabouret has pointed out these advantages. It is obvious that if one could do away with the large end platforms, considerable advantage would be obtained. For this reason it is good practice to build a terminal station on two levels, as in so doing space is gained at the end of the platforms in which to carry out shunting operations. There is, however, another side of the question. There is no doubt that the handling of parcels and luggage, also the movement of the public, are rendered more difficult from the fact that they have to be moved from one level to another.

I think that from a local point of view, the terminal station at Milan has decided advantages. I am afraid, however, there must be certain difficulties from the fact that it has to play an important part in the national and international railway connections which take place there.

Meeting held on 19 April 1922 (afternoon).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — We will resume the discussion of question IX. I call upon Mr. Nitesco.

Mr. Nitesco, Roumanian State Railways. (In French.) — Our colleague, Mr. Maccallini, states in his report that it is an advantage to keep the marshalling of departing trains the same as when they arrive, especially in stub, or dead end, stations. He adds that for dealing with trains at these stations, one brake van should be placed at the head of a train and another as the rear.

I would like to know how one deals in such a case with a luggage van and postal van which are at the front of the train. If the same composition of train is maintained on arrival as on departure, these vans would then be at the tail of the train.

Mr. Maccallini. (In French.) — In American practice these vans are always placed at the head of a train. It is for this reason that loop stations are provided in that country, or even, as at St. Louis, a station is provided where the trains are turned before entering. In France one luggage van is placed at the head of a train and one at the tail.

Mr. Nitesco. (In French.) — And the postal van?

Mr. Maccallini. (In French.) — In Italy this van is placed either at the head or tail of a train, this practice varying on different lines and at different stations. We are therefore in a position to recommend that the trains should be marshalled so as to avoid shunting as far as possible. If it is desired to retain

the original make-up of the train, one must be prepared to do some shunting at terminal stations.

Mr. Nitesco. (In French.) — This is a question to be looked into.

Mr. Maccallini. (In French.) — Everything which leads to a reduction in the amount of shunting is to be recommended.

Mr. Nitesco. (In French.) — The more one economises in shunting at the terminal station, the more inconvenience one encounters on route.

Mr. Maccallini. (In French.) — I believe the Paris-Lyons-Mediterranean have always one van at the head and one at the tail of a train so as to avoid shunting at terminal stations.

Mr. Brisse. (In French.) — As regards the second paragraph of the final summary of Mr. Maccallini's report, which deals with the advantage which may be gained by a loop as a means of simplifying shunting, it would be well if the representatives of the American railways would give the members present a few supplementary remarks on the daily use which is made of this arrangement in the New York Central Station.

Mr. Crimail. (In French.) — I was not in service when I was there in November 1921.

Mr. Brisse. (In French.) — I should like to know whether a lay-out in which a loop is used does not result in a larger number of platform lines being necessary in order to deal with a given volume of traffic.

From information received this morning from Mr. Baldwin, I think I may say that according to the intentions of the designers of the New York station, the use of the loop was to entail a certain amount of specialisation of the platform lines, the long platforms connected to the arrival lines being used almost exclusively for incoming trains and for the detrainment of passengers, and the dead end platform lines being used more especially for departures.

Though not absolute, such specialisation must of necessity result in a certain amount of redundancy. In fact, if one glances at the plan of a suburban station which is given in Mr. Baldwin's report, one notices that in order that the train may have access to the two main lines, there are, at the entrance of the suburban station, four main lines and then four very long platforms with six connecting lines, and in the departure station sixteen lines connected to eight platforms. Are not these figures very high for the intensity of traffic which can be handled on two main lines in the same direction?

Mr. Baldwin, *reporter*, gave some information on loop stations in the United States.

Mr. Brisse. (In French.) — I think I quite understand what Mr. Baldwin has just said.

The high level loop is in service, and in coming trains discharge their passengers on the right hand portion. The empty train is liberated by the loop and is set back into one of the dead end platforms, the engine then going straight to the shed.

The point which I should like to emphasise on this subject is that which I have touched upon earlier. In this arrangement there are two platform lines at which each train has to call. On arrival

the train draws up on one particular line and departs from another.

My remarks do not deal with the advantages which may result from the simplification of movements, advantages which I look upon as realised, since the movements are carried out in the same direction, and also as a number of other additional movements which waste time have been eliminated, but rather to draw attention to the increased accommodation necessary to deal with a given amount of traffic with this type of station. Not only is ample space needed, in order that the radius of curvature of the loop may not be too small, so that a reasonable speed can be realised, but consideration must also be given to the operations in the station itself in connection with the arrival and departure of trains, and with their loading and unloading.

In order to gain the full advantage in time and money which should result from the loop arrangement, one should in some way have a double set of platforms to which the public have access and along which trains draw up for arrival and departure. I think I should also remark that the set of platforms used in particular for arrivals need only be relatively small. Three platforms along which two trains may be placed simultaneously for unloading are sufficient to deal easily with thirty trains an hour at least.

The principal point of my remark is to draw attention to the fact that in order to gain the advantages sought for from the point of view of simplicity of operation from the use of the loop, it is necessary to increase appreciably the length and number of platforms used by the public and alongside which the trains draw up to load and unload passengers.

The President. (In French.) — For suburban traffic there is no luggage

morning and evening, and unloading is done very quickly.

Mr. Brisse. (In French.) — I should like to know if in the evening the train loads up at the platform on the right or at the platform in the centre.

Mr. Maccallini. (In French.) — We agree with Mr. Brisse in his view that the loop may give some advantages, and also that certain comments made be made on these. It may be very costly to build, but from the point of view of economy in shunting, there is no doubt that it offers very great advantages. It is for this reason that we have proposed paragraph 2 of the final summary.

Mr. Moutier. (In French.) — Gentlemen, after the discussion which has just taken place, it appears difficult to agree to a final summary as rigid as that which is proposed. I may say, however, that in railway matters, as in other matters, it is not sufficient to only consider the technical question, other factors which are even of decisive importance intervene, especially are there political and local questions, as well as financial considerations which have to be taken into account. If one could get rid of all political or local points, and if the question of cost did not enter into the matter, one could very easily solve the question as regards the choice of the best lay-out. Unfortunately one finds, on looking into the matter, that the best solution usually comes up against these two obstacles : the various interests which have to be considered and the lack of funds at ones disposal, prevent the best scheme being put into practice because the expense is too great for the financial situation, or because it is not popular in the district, and you know quite well that a wise government state will never run counter

to the local wishes of a substantial majority.

I was not surprised therefore, that while we have just heard that in America, the loop under the general level of the station is a very satisfactory arrangement where space is lacking, it does not, however, appear to be used in France or in Italy, where curiously enough, while at Lille it is intended to build a through station in place of the existing terminal station, at Milan a terminal station is proposed in place of the through station, which has only been built a few years.

The inhabitants of Milan, who are only concerned with their own interests and want very few through passengers, ask for a terminal station, heedless of the difficulties which the railway may have to overcome in dealing with international traffic. Moreover, it is perhaps the best solution from a financial point of view, because one could obtain, if it does not already belong to the railway authorities, the land for a terminal station, while it would be necessary to go some distance from the town in order to get the space for the through station.

It should be said that at Lille a complete agreement has not yet been reached as regards the substitution of a through station for the terminal station. The municipal authorities desire to profit from the building of a through station on the site of the old fortifications, which are now demolished, which is worth several francs per metre; in this it is opposed by the Chamber of Commerce, which consists largely of representatives of the old city of Lille, who say that they are quite satisfied with the present station and are somewhat afraid of competition if the station is placed further away and hotels and shops built, as the new comers might be in a better position close to the new station.

These cases cannot be taken as proving anything.

The technical experts who were, however, free from all political bias which might exercise a strong influence on the question, unanimously agreed that in spite of the truth of certain arguments of those in favour of a terminal station with its end platform and the advantages arising therefrom, the advantage on the whole was strongly with the through station, which could be used if required as a terminal station, but which presented, as regards movement of trains and shunting, the overwhelming superiority of being able to liberate the trains on the other side, thereby increasing its capacity. As the Reporter has very truly said, however, the value of the tool depends upon ones skill in using it.

Moreover, as regards the loop which has been mentioned for the large American stations, there are « loops » and « loops ».

In general, as is mentioned in the said report, American loops are under the level of the stub, or dead end, platform lines and are themselves surrounded by platform lines for incoming trains, which as soon as the passengers have alighted, are set back into the dead end platform lines on the level above before departing. As Mr. Brisson has already said, a train occupies two different platform lines on its arrival and on its departure.

The proposed loop at Lille station is quite a different matter, in that it is outside the station and is used as an entry or exit in whichever direction is required for trains passing through the station or for empty stock coming in from storage sidings for loading up or returning after having been cleared of their passengers and luggage, a function which is imperfectly carried out by the triangles which

are constructed in America at the entrance of terminal stations to allow the trains to back into the station in order to use the same engine for the outward journey and to avoid deranging the marshalling; the postal vans according to the American practice being always at the head of a train.

It is also an important emergency device, as it gives a free passage to passenger trains in both directions in the case of an accident, which for the time being blocks the ordinary lines.

I may perhaps, while I am speaking, make a few remarks with regard to the suburban service and the main line service, which may be dealt with together or separately in the same station.

As regards suburban service, one may say that the only engine movements are in running round the train, the engines having their sheds where they coal and water outside Paris. In every case, modern steam locomotives are reversible and run equally well in either direction, the operation is thus very simple as no turning is required. We may also ask ourselves if in the period which will elapse before electrification becomes general on the Nord of France, we may not anticipate the principle of reversing the trains themselves, the engine being at the head of the train drawing it in one direction and at the rear of the train pushing it in the other direction. The following is what is done. For running in the normal direction, everything is as usual. For running with the engine at the rear, the method is then as follows : the driver leaves his engine after having closed the regulator and goes to the front driving compartment with a key which puts into action on the last coach, which now becomes the head of the train, devices which control the whistle, regulator and conti-

nous brake. He thus drives the train, which is propelled by the engine, the fireman only remains upon the engine to attend to the fire and work the hand-brake. This train, which is made up of about eight vehicles, has run for more than twelve years between Paris and St. Denis.

As regards the main lines, trains may be drawn into the platform lines direct from the storage sidings after arriving at the station. The engine, which is freed after the train has gone out, may be attached to an incoming train in order to take this to the storage sidings by an underground line so as to avoid crossing the lines at the entrance of the station on the level. These underground lines, which are known as « terriers » make it necessary that the shed and storage sidings shall be at some distance from the station. Mr. Payet's remark regarding the lack of space at the Montparnasse station, Paris, which makes it necessary, through lack of space, to place the engine sheds and storage sidings at some distance away, is not thus an inconvenience, because the methods used in this case are made possible by this distance.

Mr. Kirkness, Madras & Southern Mahratta Railway. — At what speed does the train run when the driver is at the end of the train away from the engine, and what is the length of the train?

Mr. Moutier. (In French.) — The train consists of six to eight vehicles and is 80 m. (262 feet) in length and runs at a speed of 45 km. (27.9 miles) an hour.

Mr. Maison. (In French.) — As I said at the meeting this morning, local conditions do not always allow the programme laid down in the final summary to be put into practice as regards the extension

of stations, and therefore this summary is too rigid.

In order to include what I said, I ask permission to put forward, not a new final summary, but to complete that of Mr. Maccallini by two additions so as to make them less rigid.

I propose therefore to add the following :

« Whenever the local circumstances, independent of the railway, do not render the extension of the terminals impossible, the economies of operation and increase of the capacity of the stations justify considerable expenditure for the purpose of providing lay-outs and facilities leading to a reduction of the number of movements of engines and empty rolling stock. To this end careful estimates of operating costs should be made in the designs of new plants and statistical data compiled for the existing ones. »

I then propose to add :

« But if in some large towns it is impossible to extend the railway premises, improvements must be sought for by removing the items which are not immediately concerned in handling the passenger traffic, such as, storage sidings and engine sheds, and by connecting these with the platform lines by special roads. »

Mr. Maccallini. (In French.) — It would be preferable to preface the whole final summary with a paragraph having a general bearing, explaining that it deals with the question of reduction of the number of movements of engines and empty stock on the understanding that the possibility of its being applied in practice depends upon the local conditions.

Mr. Maison. (In French.) — Some reservation appears to me to be necessary,

because the complete summary as drawn up might finally serve as a basis for examining schemes for improving the service in terminal stations. In bringing forward a project, one would quote no doubt the rules laid down which might, however, lead to results other than those desired.

In some circumstances it is necessary that this point should be made clear. Railway administrations might ask for solutions which would not be approved of, and this would give rise to continuous disputes with municipalities, chambers of commerce and popular opinion; disputes would in many cases retard the execution of the scheme.

It would therefore be wiser to say that, from a technical point of view the solutions recommended are the most satisfactory, provided that the extensions are possible. At the present time one could not hope to find in Paris a square metre of ground for railway purposes, and improvement in the station services should be sought for by using the space occupied by depots and removing such items away from the centre of the town.

Mr. Maccallini. (In French.) — I am not opposed to Mr. Maison's amendment, but I think it should also have Mr. Baldwin's approval since it is from my colleague's report that this item of the final summary has been taken.

Mr. Baldwin. — I agree to Mr. Maison's amendment.

The President. (In French.) — Mr. Maison proposes to add the following : « But if in some large towns it is impossible to extend the railway premises, improvements must be sought for by removing the items which are not immediately concerned in handling the passenger traffic, such as storage sidings and engine sheds,

and by connecting these with the platform lines by special roads. »

Mr. Brisse. (In French.) — This last paragraph has the disadvantage of enlarging the question and not limiting it to its substance as laid down : « Arrangements made with the object of reducing the number of movements of engines and empty stock in passenger terminal stations. »

Also, this addition affects to a certain extent the views expressed here on the general organisation of the stations in large towns, and it would perhaps be outside the immediate question to introduce considerations and conclusions of this nature, however justified they may be in themselves. I do not see any direct and immediate connection between this paragraph and arrangements which have for their object the reduction of the number of movements of engines and empty stock in terminal stations.

Mr. Maison. (In French.) — I think that the paragraph which I have proposed is an indispensable addition to the final summary presented by the two reporters.

Mr. Maccallini. (In French.) — While we are of the opinion that the addition proposed by Mr. Maison is not necessary, we are prepared to accept it.

— The amendment proposed by Mr. Maison was put to the meeting and carried with the exception of the final addition.

The President. (In French.) — The following is the second paragraph of the final summary of the special reporter :

« 2) Loop stations constitute the best method of reducing to a minimum the movements necessary for quickly liberating the platform lines, turning the trains

and taking them to the empty stock sidings, and for obviating all the inconvenient shunting which has as a rule to be performed in terminal stations. »

Mr. Brisse. (In French.) — This paragraph is a little too formal. A reservation should be introduced in view of the possibility of the adoption of loop stations. I propose we say :

« Loop stations, where it is possible to construct these, form the best solution in order to reduce to a minimum the movements, etc. »

Mr. Maison (In French.) — That is very much the same idea.

Mr. Moutier. (In French.) — Could we not add « and at stations where certain traffic finishes its journeys which are therefore similar to terminal stations. »

The reason that I make this proposal is because Lille station will operate largely as a terminal station, and in order to avoid congestion, a loop will be used on the same principle as the American loops and triangles.

Mr. Maison. (In French.) — The addition proposed by Mr. Moutier will give rise to a certain confusion in the text.

As regards Mr. Brisse's amendment, it is quite correct and has my support.

Mr. Brisse. (In French.) — One should keep the term « loop station » which is general.

— Paragraph 2 of the final summary was adopted with Mr. Brisse's amendment.

The President. (In French.) — « 3) A triangle, preferably placed between the station and the sidings will effect great economy in handling stock in stub or dead end terminals. »

Mr. Maccallini. (In French.) — This is the case with the St. Louis station.

Mr. Brisse. (In French.) — I propose to say : « the interposition of a triangle between the station and the carriage sidings is capable of producing great economy, etc. ».

Mr. Maison. (In French.) — That is the same thing. I think we might adopt the text as it is submitted to us.

Mr. Brisse. (In French.) — I am afraid that our final summary may appear rather too lengthy to the General Meeting. It would therefore be as well to delete a few paragraphs, which although interesting, enter too much into detail.

Mr. Maison. (In French.) — Is this suggestion agreed to?

Several voices. — Delete the paragraphs.

Mr. Vigna. (In French.) — I am opposed to deleting these paragraphs. The efficiency of a triangle when it is placed between the arrival station and the adjacent lines is certainly very considerable. The triangle allows the whole train to be turned, and after this has been done, the locomotive is still at the head of the train in its normal direction followed by the luggage van, the tail of the train also remaining with the same make-up.

There is no doubt that a triangle enables one to avoid shunting in re-marshalling the train and turning the engines.

— Paragraph 3 of the final summary was put to the vote and adopted.

The President. (In French.) — « 4) A well designed lay-out at the entrance to the station is essential for the economical

operation and full utilisation of station roads or lines, particularly in the stub or dead end stations. »

— Adopted.

The President. (In French.) — « 5) It is very advantageous to separate as far as possible main line passenger from suburban traffic. »

— Adopted.

The President. (In French.) — 6) « The placing of vans for postal and parcels services on separate lines necessitates a greater amount of shunting, but has its advantages from other points of view. Independent luggage platforms, as well as mechanical means for expediting the loading, unloading and transfer of baggage, postal and ordinary parcels, besides other advantages, may lead towards a reduction of shunting. »

Mr. Maccallini. (In French.) — This is a proposal supported by Mr. Baldwin, because by this means the loading is carried out more quickly and it avoids the necessity of replacing the train at the platform in order to complete unloading after it has been necessary to free the line in order to accommodate another train.

Mr. Brisse. (In French.) — We are again getting away from the question. I propose therefore to delete the second paragraph.

Mr. Maison. (In French.) — The text is perfectly correct in that it says « may lead » and not « will lead ».

A Delegate. (In French.) — Put « may in some cases lead to ».

Mr. Vigna. (In Italian.) — It appears to me that we are dealing with this question in rather too narrow a manner.

When we say that these circumstances may lead to a reduction in shunting, our meaning is quite definite. I do not think we can say that this may not be the case.

The same thing is true as regards the third paragraph. Any of us who have seen the working of a triangle cannot doubt that it is able in certain circumstances to be of utility in avoiding shunting. If the whole train is turned, it is absolutely unnecessary to replace the luggage van at the front of the train or to turn the brake vans and locomotive, etc. To say that a triangle may not lead to a reduction in shunting, as will be the result of deleting the third paragraph, would be an error. We have also to consider in the same way the question of the sixth paragraph where we do not want to say that one can avoid shunting if given a certain type of lay-out. The text as proposed by the President appears to me perfectly correct. To exclude this possibility is to depart from practical stations.

The President. (In French.) — As nobody else wishes to speak, I will put to the vote paragraph 6 as submitted to you.

— Adopted.

The President. (In French.) — « 7) Platform lines used for general purposes (*i. e.*, arrivals and departures) as a rule, are better than specialised platform lines, in that they allow a certain reduction in the amount of shunting and also can be more efficiently utilised. »

Mr. Maison. (In French.) — The word « certain » should be deleted as well as « general ».

Mr. Brisse. (In French.) — One should also say « commonly used platform lines for departure and arrival ». (*Hear, hear.*)

— Paragraph 7, as thus amended by Messrs. Maison and Brisse, was adopted.

The President. (In French.) — « 8) In order to release the engines of arriving trains in stub or dead end terminals, it

may be desirable, especially in suburban services, to connect the platform roads, two by two, and even with a central running road interposed. »

— Paragraph 8 was adopted.

Meeting held on 20 April 1922 (afternoon).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — We have to consider paragraph 9 which reads as follows :

« 9) Sidings at the ends of the platforms are very useful to allow engines to be changed quickly. They may also be used for accommodating vehicles detached from the trains at the platform, or those which are to be attached.

« The very general use of traversers and the use of connections between adjacent lines is of great utility in facilitating the attachment or detachment of vehicles with the minimum amount of shunting. »

Mr. Bonnevay, principal secretary. (In French.) — Generally speaking the paragraphs are too long, that being so, it is possible that the general meeting will delete a large number. We should therefore shorten these and say, for example, to take the one we are now dealing with : « Lines at the end of the platforms are very useful. The use of traversers or of cross-overs in the station between the adjacent platform lines are also very useful. »

Mr. Nitesco. (In French.) — I think that as regards the use of traversers one might delete the words « very general ».

Mr. Maccallini. (In French.) — One should indicate the reasons for which these devices are used.

Mr. Nitesco. (In French.) — Are traversers in use in America? It is too much to say that they are in general use.

Mr. Bonnevay. (In French.) — There is a tendency to abandon these in all new stations.

Mr. Maccallini. (In French.) — Traversers as well as cross-overs within the station are very useful.

Mr. Nitesco. (In French.) — Cross-overs are useful, but traversers are out of date.

Mr. Maccallini. (In French.) — If there is a wagon which has to be placed at the head of a train, it is necessary to carry out shunting.

Mr. Bonnevay. (In French.) — The final summary need not give the reasons on which it is founded. One may say « Lines at the ends of the platforms, as well as traversers or cross-overs between platform roads, are very useful in simplifying shunting. »

Mr. Baldwin. — I agree to this wording.

— Paragraph 9, as amended by Mr. Bonnevay, was adopted.

The President. (In French.) — « 10) The empty stock sidings should consist of a sufficient number of lines to be able to

fully cope with the maximum amount of traffic, and should be of sufficient length to hold the longest trains without having to divide these.

“ They should be placed, whenever possible, within the station, preferably between the main lines, and so arranged as to be accessible from either end in order that empty stock can be simply drawn or set back into the sidings without affecting the marshalling of the trains. When the sidings are separate from the station, they should always be connected to it by independent lines so as to avoid congesting the main lines. »

Mr. Maison. (In French.) — I proposed yesterday to add to the first paragraph a reservation, which was agreed to by the section, as regards the difficulties of extending large terminal stations by reason of the impossibility of purchasing the necessary land in some large towns.

After having again looked into the question, it appears to me that there is a certain amount of contradiction between paragraphs 10 and 13, which speak of storage sidings and engine sheds, and the addition to the first paragraph, which was agreed to yesterday. It seems preferable to unite paragraphs 10 and 13 and complete them by the following addition :

“ The storage sidings must consist of a sufficient number of lines to easily deal with the maximum traffic; they should be long enough to accommodate the longest trains.

“ They should be situated, as far as possible, when the space available allows it, in the terminal, preferably between the main roads or lines, and arranged in such a manner as to have the roads open to access at both ends. »

I propose to delete the remainder to

paragraph 10, and to add the following, which is taken from it, to paragraph 13 :

“ It is also advantageous to place the locomotive sheds as close as possible to the passenger stations, connecting them up with independent lines which should give easy access to the platform roads and the storage sidings. »

Finally I propose to complete this paragraph by the following addition :

“ If, however, as it is the case in some large towns, the available room is limited, it is best to remove those features that do not directly affect the passenger service — such as storage sidings and locomotive sheds — to a point away from the station. They should then, however, be connected to the station by independent lines. In such cases, if possible, auxiliary accommodation should be provided near the station at which the locomotives can be turned and supplied with coal and water. »

Mr. Nitesco. (In French.) — I agree with Mr. Maison with whom I have collaborated in drawing up this last wording.

Mr. Baldwin. — I propose to insert the word « practically » in the text.

The President. (In French.) — As nobody else wishes to speak, I put the text proposed by Mr. Maison to the vote.

— This text was adopted.

The President. (In French.) —
“ 11) Auxiliary sidings close to the neck of the station, in easy communication with the platform lines and empty stock sidings, are very useful for making up trains and as lie-by accommodation. »

As a result of a preceding decision, this paragraph will disappear.

“ 12) Circulating lines alongside the lines in the neck of the station, and affording direct communication between the engine shed, the empty stock and carriage cleaning sidings, and from the luggage, postal and parcels warehouses to a certain number of the platforms, are of great assistance in preventing congestion during busy hours of the day. »

— Deleted.

The President. — Paragraph 13 has been incorporated with paragraph 10, it therefore disappears as a separate paragraph.

“ 14) (old 14) Plenty of cross-overs and connections between the several roads tend to simplify and reduce shunting. Large double cross-overs at the end of the station, connecting all roads, are particularly useful. »

— Adopted.

“ 12) (old 15) It is desirable to carefully study the make-up of the trains so that it is not necessary to interfere with this in stub or dead end terminals; in such cases it will be found advisable to place a brake van at each end of the train. »

— Adopted.

“ 13) (old 16) It is desirable to use the storage sidings for cleaning, in order to avoid moving the empty trains. »

— Adopted.

“ 17) Electric traction offers great advantages over steam traction on account of the suitability of electric locomotives for running equally well in either direction, and especially in the case of suburban services, as sets of vehicles can be run in either direction without altering the marshalling of the various units by using

a tractor at either end, or better still, by means of the multiple unit system. »

Mr. Crimail. (In French.) — Electric traction is necessary in all stations where there are underground lines. This point is not brought into this paragraph of the final summary.

Mr. Maison. (In French.) — Let us word the text as follows :

“ From the point of view of the reduction of shunting, electric traction has great advantages, etc. »

— Paragraph 17 (14) as thus amended was adopted.

The President. (In French.) — “ 18) Stations having lines at two levels lend themselves to the use of special devices for liberating engines, etc., from dead end platform lines. »

Sir Herbert A. Walker, London & South Western Railway. — I should like to know what are the methods employed in stations on two levels for freeing engines.

Mr. Nitesco. (In French.) — This may be by a traverser or by connections within the station.

Mr. Maccallini. (In French.) — One should make a distinction between lines on different levels and the different stories of the building.

Mr. Maison. (In French.) — When one speaks of a station on two levels, one means that the lines are on two levels.

Mr. Maccallini. (In French.) — We might have a station with lines on two levels or a station with two storied buildings, the first case being the most interesting. However, both solutions offer advantages from a point of view of facilitating shunting which can be carried

out on the lower level because it is possible to accommodate the necessary lay-out below the buildings.

Sir Evelyn Cecil, vice-president. (In French.) — I should like to know if there are stations on two levels in which engines are lifted from a high level to the low and from the low to the high.

Mr. MacCallini. (In French.) — I do not know of a station where this is done, even in America. I propose to simply delete paragraph 18, which mentions stations on two levels.

Mr. Nitesco. (In French.) — I agree.

Mr. Maison. (In French.) — Before deleting this paragraph we should obtain Mr. Baldwin's views.

Mr. Baldwin. — I have no objection to this being deleted.

The President. (In French.) — As nobody else wishes to speak, I put the deletion of paragraph 18 to the vote.

— This deletion was approved of.

The President. (In French.) — « 15) (old 19) Movements of engines are reduced if the empty vehicles are withdrawn on arrival by means of the train engines, without using shunting engines. »

— Adopted.

« 16) (old 20) It is of great importance that the various portions of the lay-out of a stub or dead end terminal — including locomotive sheds — should be placed so as to permit of the proper sequence of operation with the minimum of shunting. »

— Adopted.

DISCUSSION AT THE GENERAL MEETING

Meeting held on 26 April 1922 (afternoon).

Mr. R. de CORNÉ, HONORARY VICE-PRESIDENT, IN THE CHAIR.

GENERAL SECRETARIES : Mr. J. VERDEYEN; Mr. E. FRANZA; Sir HENRY FOWLER.

ASSISTANT GENERAL SECRETARY : Mr. N. GIOVENE.

Sir Henry Fowler, general secretary, read the

win's reports, and the summary he submitted to the section.

« Three types of passenger terminals had been compared for the advantages and drawbacks they offer : Stub or dead end terminals, loop terminals, and through terminals.

(See *Daily Journal of the session*, No. 6, p. 41.)

« Mr. MACCALLINI (*special reporter*) read a summary of his own and Mr. Bald-

win's reports, and the summary he submitted to the section.

not consider stub or dead end stations, which had been chiefly dealt with by the special reporter, to be a good type. He mentioned instances, notably those of Leipzig and Zurich, where the stub or dead end terminals had proved anything but satisfactory.

“ Mr. BRISSE (*Eastern Railway of France*) drew the attention of the meeting to the need of clearly defining what was meant by terminal stations before continuing the discussion.

“ The nature of the traffic is the determining factor. A terminal station is a station where there are no through roads, or else, where the trains which pass through it are few in number, the bulk of the traffic starting or finishing its journeys therein.

“ The lack of success referred to by Mr. Simon-Thomas is due to the fact that these stations are not true terminals, the through traffic being more important than the local. In cases where the suburban traffic is the more important, the dead end station situated in the heart of the town is, on the other hand, a necessity.

“ Mr. CRIMAIL (*Chinese Government*) and Mr. DAVIES (*London & North Western Railway*) wished to know the reasons which led the Italian railways to contemplate constructing a dead end station at Milan in place of the present through station.

“ Mr. VIGNA (*Italian State Railways*) explained the local conditions which led to this decision.

“ Mr. BRISSE considered that the local traffic at Milan should justify this alteration, while on the contrary, at Lille the nature of the traffic has justified the substitution of a through station in place of an existing dead end station.

“ As regards the loop stations, so strongly recommended by Mr. Baldwin, while quite recognising the advantages of this type, he would like to know whether the use of a loop did not lead to a considerable increase in the number of platform lines. It entailed, in fact, a more specialised use of the lines, which was contrary to another proposed conclusion which recommended their common use.

“ An examination of the plan of the Grand Central Station at New York appeared to confirm this belief, since it appeared that there were seventeen platform lines for two running roads in each direction. This appeared to be a very high proportion.

“ Mr. BALDWIN (*reporter*) gave some information respecting the organisation of such a station in answer to this objection.

“ Mr. SABOURET (*Paris-Orleans*) mentioned the special arrangements adopted at the Quai d'Orsay Station in Paris to overcome some of the defects of a dead end station which had not been mentioned in the reports. These consisted of an electric traverser for locomotives placed at the head of the station, this arrangement being rendered possible by the fact that this space is not utilised for platform accommodation.

“ Mr. MAISON (*French Government*) remarked that in his opinion some of the proposed summary was too rigid, especially that which tended to justify by economy in working, the considerable expense of placing certain adjuncts, such as empty stock sidings, engine sheds, etc., as close as possible to the stations. In many cases it is as a matter of fact practically impossible to apply this to existing large terminal stations.

“ He proposed some amended wordings which were considered.

“ Mr. PAYET (*French State Railway*) supported Mr. Maisons’ remarks, and quoted the particular case of the Montparnasse Paris Station.

“ Mr. MOUTIER (*Northern Railway of France*) also considered some of the summary as being too absolute. In his opinion, technical considerations are not always the preponderating factors in the choice of a type of station. Local sentiment and financial considerations have their effect in the majority of cases. Besides the reasons arising from the nature of the traffic, it is possible for example, that such considerations may account for the choice of the types of station at Milan and Lille.

“ Mr. SIMON-THOMAS having remarked that the common use of lines was sometimes dangerous and necessitated very complicated interlocking, Mr. MOUTIER quoted the case of the Nord Station in Paris, where complete common use was made of twenty-eight platform lines, in order to increase the capacity, when necessary, but where, under normal conditions of traffic, the lines were specialised in three groups, one for main line arrivals, one for suburban traffic and one for main line departures.

“ After the discussion had been continued by Messrs. VIGNA and NITESCO (*Roumanian State*), and by Sir Herbert A. WALKER (*London & South Western Railway*), the section decided to put forward the following summary to the general meeting. ”

The President. — This is the

Final summary.

“ 1° Whenever the local circumstances, independent of the railway, do not render the extension of the terminals

“ impossible, the economies of operation and increase of the capacity of the stations justify considerable expenditure for the purpose of providing lay-outs and facilities leading to a reduction of the number of movements of engines and empty rolling stock. To this end careful estimates of operating costs should be made in the designs of new plants and statistical data compiled for the existing ones;

“ 2° Loop terminals, where their installation is possible, are a most advantageous solution in order : to reduce to a minimum the movements for quick clearance of the platform roads; to turn the trains; to give access to the sidings, and to do away with the movements that must usually be made in stub or dead end terminals;

“ 3° A triangle, preferably placed between the station and the sidings will effect great economy in handling stock in stub or dead end terminals;

“ 4° A well designed lay-out at the entrance to the station is essential for the economical operation and full utilisation of station roads or lines, particularly in the stub or dead end stations.

“ 5° It is very advantageous to separate as far as possible main line passenger from suburban traffic;

“ 6° The placing of vans for postal and parcels services on separate lines necessitates a greater amount of shunting, but has its advantages from other points of view. Independent luggage platforms, as well as mechanical means for expediting the loading, unloading and transfer of baggage, postal and ordinary parcels, besides other advantages, may lead towards a reduction of shunting;

“ 7° The use of common platform roads for both the arrival and departure of

“ trains, causes less shunting than having the trains discharge on arrival at specialised platforms different from those at which they load up before departure. In addition, the available room at a station is made better use of by this method of working;

“ 8° In order to release the engines of arriving trains in stub or dead end terminals, it may be desirable, especially in suburban services, to connect the platform roads, two by two, and even with a central running road interposed;

“ 9° Lines at the ends of the platforms, as well as traversers or cross-overs between platform roads, are very useful in simplifying shunting;

“ 10° The storage sidings must consist of a sufficient number of lines to easily deal with the maximum traffic; they should be long enough to accommodate the longest trains.

“ They should be situated, as far as possible, when the space available allows it, in the terminal, preferably between the main roads or lines, and arranged in such a manner as to have the roads open to access at both ends.

“ It is also advantageous to place the locomotive sheds as close as possible to the passenger stations, connecting them up with independent lines which should give easy access to the platform roads and the storage sidings.

“ If, however, as it is the case in some large towns, the available room is limited, it is best to remove those features that do not directly affect the passenger service — such as storage sidings and locomotive sheds — to a point away from the station. They should then, however, be connected to the station by independent lines. In such

“ cases, if possible, auxiliary accommodation should be provided near the station at which the locomotives can be turned and supplied with coal and water;

“ 11° Plenty of cross-overs and connections between the several roads tend to simplify and reduce shunting. Large double cross-overs at the end of the station, connecting all roads, are particularly useful;

“ 12° It is desirable to carefully study the make-up of the trains so that it is not necessary to interfere with this in stub or dead end terminals; in such cases it will be found advisable to place a brake van at each end of the train;

“ 13° It is desirable to use the storage sidings for cleaning, in order to avoid moving the empty trains;

“ 14° From the point of view of the reduction of shunting, electric traction has great advantages over steam, chiefly owing to the ability of electric locomotives to operate in either direction and to the possibility of working, especially for the suburban services, trains able to run in either direction without displacement of the vehicles, by using either a tractor at each end or the multiple unit system;

“ 15° Movements of engines are reduced if the empty vehicles are withdrawn on arrival by means of the train engines, without using shunting engines;

“ 16° It is of great importance that the various portions of the lay-out of a stub or dead end terminal — including locomotive sheds — should be placed so as to permit of the proper sequence of operation with the minimum of shunting. ”

— The general meeting ratified this summary.

GOODS (FREIGHT) STATIONS

Organization of the receiving and the delivering stations, so as to accelerate their business.

Arrangement of the buildings and tracks so as to simplify shunting (switching) operations and handling, particularly as regards goods in bulk. Mechanical appliances.

Preliminary documents.

1st report (all countries, except Italy and those using the English language), by Messrs. JULLIEN and MOUTIER. (See English edition of the *Bulletin* of January 1922, p. 151, or separate issue [with red cover] No. 50.)

2nd Report (Italy), by Mr. E. EHREN-FREUND. (See English edition of the *Bulletin* of January 1922, p. 5, or separate issue [with red cover] No. 50.)

3rd report (countries using the English language), by Mr. H. G. KELLEY. (See English edition of the *Bulletin* of May-June 1922, p. 785, or separate issue [with red cover] No. 63.)

Special reporter : Mr. JULLIEN. (See English edition of the *Bulletin* of April 1922, p. 675.)

SECTIONAL DISCUSSION

Meeting held on 20 April 1922 (afternoon).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — We are dealing with question X. I shall call upon Mr. Moutier, who has been entrusted with making the summary of the three reports, to speak.

Mr. Moutier, reporter. (In French.) — Gentlemen, I do not need to remind you that, according to the method adopted at

the International Congresses and particularly at the present Congress, numerous reports have been made on special questions by men having expert knowledge who have agreed on the investigations that have resulted in the summary. It is, therefore, the office of the special reporter, Mr. Jullien, to speak on the subject of these recommendations; but as he is

detained in another section, I am taking his place here and will read you the special report which has been published in the April 1922 number of the *Bulletin*.

The President. (In French.) — As a general Report has been made on the question we can deal with the summary at once :

« 1) It is important in arranging stations that the goods traffic should be completely separate from the passenger traffic. »

Mr. Hanrez, vice-president. (In French.) — I propose that the words « as far as possible » should be added, because the words « it is necessary » imply the idea of this being essential.

Mr. Nitesco, Roumanian State Railways. (In French.) — It would be better to suppress the words « it is necessary » and to say : « it is to be recommended that the goods (freight) service should be completely distinct from that of the passenger.

Mr. Eir, Danish State Railways. (In French.) — I propose that we should say : « In the installations of large stations, it is necessary that, etc ». Actually there are many stations in which it is impossible to separate the goods service from that of the passengers.

Mr. Nitesco. (In French.) — It would be sufficient to add the words « as far as possible ».

Mr. Maison, Ministry of Public Works, France. (In French.) — It might be worded : « In large stations it is necessary, as far as possible, etc. ».

Mr. Vigna, Italian State Railways. (In French.) — It is necessary that in all stations, the slow goods service should be

separate from the passenger service. This is the usual practice.

Mr. Maison. (In French.) — In considering the goods service the category to which the goods belong is not raised in the question. There are fast goods and slow goods. In the greater number of small stations the slow goods installations are separate from the passenger service. The same does not hold with regard to the fast goods service, which, in small stations, is generally combined with the passenger service. Now the complete separation of the two services can only be effected in large stations.

Mr. Vigna. (In Italian.) — It is a fact that the fast goods service is very often combined with the installations provided for the passenger service. But the complete separation of the goods service from the passenger service is neither possible nor desirable except when we have to do with lines carrying so heavy a traffic that trains are run specially for the fast goods traffic.

If we have installations arranged for the goods service that are quite separate from the passenger service, and if the fast goods service is carried out — as is done on all lines carrying little traffic — by means of passenger trains, we shall have this disadvantage : it will either be necessary to make two stops; one for the passengers, and the other for the goods trains, or it will be necessary to carry out, in the same place, the loading and unloading of goods and subsequently to transport them to the warehouses. But this is not practicable; no Administration would authorize expenses of this kind which would increase the cost of working. Theoretically we are in agreement that the passenger service is distinct from the goods service (and even the fast goods

service), as we have already said, when it was a question of lines on which, on account of the importance of the traffic, the passenger train service could be separated from the fast goods service. But I do not think that the separation of these installations for fast goods and for passenger traffic in the stations is practical, when the lines carry only light traffic, except in the case of a large station.

Mr. Crimail, Ministry of Communications, China. (In French.) — At the commencement of this discussion we should know on what subject we are going to speak, because I have an impression that the Reporters have only had in mind slow goods traffic. No report has been made by an Englishman and, under these conditions, I ask how are the delegates of the United Kingdom, where the distinction that is made on the Continent between fast and slow goods does not exist, to discuss conclusions relating to the methods of working in France and in Italy? What is to be the subject of our discussion to-day?

Mr. Moutier. (In French.) — It is difficult to take the French, Italian and English methods together at the same time. It is rather a question of giving attention to the French and Italian installations than to the English installations, of course leaving it open to our British colleagues to state what happens in their country where the methods and legislation regarding transport differ so greatly from our own. Thus slow goods traffic is practically unknown in England in the sense in which we apply the term on the Continent and, moreover, the British railway companies may instal stations that constitute regular warehouses where the goods on arrival are kept in store, just as they are in the general storehouses that

we have in France, but which are independent of the railway.

Our conclusions relate exclusively to the continental methods.

Mr. Eir. (In French.) — In Denmark there is a great difference between fast and slow goods, because perishable goods are very often sent as fast goods by passenger trains. The public having been for long past accustomed to this organization, it is impossible to make a complete distinction between the goods service and the passenger service. Even in large stations, as at Copenhagen, goods are carried by the fast service.

Mr. Maison. (In French.) — It will be necessary to define the question more accurately. Are we going to discuss the organization of the service for forwarding and delivering slow goods? It is evident that this does not apply to the English railways because no distinction is made there between fast and slow goods. But if we consider the railways of those countries in which this difference is made, I ask whether the question should be considered as applying to fast goods transport as well as to slow goods transport.

Mr. Moutier. (In French.) — We have dealt with the question as though it related only to slow goods transport. It is therefore necessary to make a separate examination of the lay-outs that have to be made for fast goods transport.

In small stations the fast goods service will be combined with the passenger service both as regards staff and space.

In a station of medium size employees and space will be specially devoted to each, but always in the main building or near the main building.

It would not, however, be necessary in

the majority of cases for the fast goods to have special loading platforms for the transport of animals, carriages, and heavy and bulky packages, those carried by slow goods being generally adequate, provided that they are conveniently connected with the lines carrying out the service.

In large towns, where the fast goods service would attain considerable volume, it might happen that it was necessary to arrange a yard for fast goods distinct from that dealing with slow goods. Everything relating to fast goods would then be centralized at a place where the fast goods wagons or vans can be attached to passenger trains, whereas the installations for the slow goods might be arranged further off, at places where rolling stock can be easily available.

Mr. Maison. (In French.) — The summary in the form in which it has been proposed is practically useless if it deals only with slow goods service. It is evident that in all stations, of whatever kind the passenger service is separate from the goods service.

Mr. Vigna. (In Italian.) — In practice it happens that in many small stations the same staff works the goods service and the passenger service, which can be done rapidly, the same offices being used. Sometimes there is only a single office with a single employee. In these cases, separate installations would only interfere with the rapid execution of the service and would involve heavier expenditure on staff. It appears to follow from this that a conclusion such as has been put forward does not rest on a solid basis, because it may be advantageous either that the passenger and goods installations should be completely separated or that they should not be separated.

Mr. Moutier. (In French.) — I propose

that the first paragraph should be deleted, because its retention would give rise to modifications which would be difficult to realise within the range of the question.

On the other hand, in order to reply to the views of the Permanent Commission, I think that the summary should be reduced as far as possible.

The President. (In French.) — As no one else has any observation to make, I will put the proposal of Mr. Moutier to the vote regarding the deletion of the first paragraph of the summary.

— The motion was carried.

The President. (In French.) — « 2) (re-numbered 1). In goods stations, special tracks should be provided for loading and unloading. These tracks should be connected whenever possible by independent lines to the arrival, departure and sorting siding. »

Mr. Eir. (In French.) — According to this there should be special tracks for loading and unloading. This will result in a loss in time involved in shunting the wagons. This specialization is, therefore, not advisable.

Mr. Moutier. (In French.) — The paragraph also takes account of the departure tracks.

Mr. Payet, French State Railways. (In French.) — The French text presents an ambiguity in the sense that it may be understood that there should be special tracks for loading and for unloading. This question is determined by practical considerations.

Mr. Nitesco. (In French.) — I propose to replace the words « there should be provided » by : « as far as possible ».

Mr. Vigna. (In French.) — It is very

advantageous to effect loading and unloading on the same track.

Mr. Moutier. (In French.) — The word « handling » would perhaps be preferable. However this may be, I propose we should say : « In goods stations the lines intended for loading and unloading should be connected as far as possible by independent lines to the arrival, departure and shunting sidings. »

— Adopted.

The President. (In French.) — The third (renumbered 2nd) conclusion is as follows : « 3) These stations should be organized in such a way that wagons can be placed or drawn out at regular intervals, in sets, during the hours that the station is closed to the public. »

Mr. Nitesco. (In French.) — The recommendation practically states : « outside the hours when the stations are open to the public ». Is this necessary?

Mr. Crimail. (In French.) — It is necessary to state it because the shunting should not inconvenience the public.

Mr. Moutier. (In French.) — I think that it is possible to cut out the words mentioned by Mr. Nitesco. When there are no special provisions, it is only possible to carry on the work when the station is closed to the public.

Mr. Nitesco. (In French.) — This is where the advantage of the « spur » arises.

Mr. Moutier. (In French.) — We have ceased to apply the « spur » on the French Northern Railway after having made certain arrangements.

An allowance was made to those who discharged their wagons within six hours and all the consignees, with very few exceptions, of individual wagons placed

on a single track took advantage of this. It was thus possible to empty the siding at one shunt leaving only a few unloaded wagons. If the siding in question was long, the wagons to be left were placed out of the road by means of points or turntables when removing the others. In every case that may cause delay it is desirable that the stations should be organized in such manner as to free the wagons at various periods in the day, even during those periods when the stations are open to the public.

Mr. Vigna. (In Italian.) — I should like the meaning of the word « organization » to be made clearer in order to enable the value of the third (renumbered 2nd) paragraph to be better understood. If it is a question of *building* a station, it is well that it should be built in such a manner that it will correspond to the object that we have in view, that is to say, that it will be possible to carry out shunting even during the time when the public is engaged in discharging the goods.

If, on the other hand, it is a question of *organizing* a station, the proper conclusion is that which states the necessity for organizing in such manner that the shunting can be carried out while the public is not engaged in unloading.

In fact, according to the meaning which is given to the word « organization » it is paragraph No. 3 (now No. 2) as printed, which answers to the object which it is proposed to attain, or it is paragraph No. 3 (now No. 2) which is being worded as exactly the contrary of the recommendation that has been printed.

Mr. Maison. (In French.) — Would it not be possible to obtain general agreement by replacing the word « organized » by « established ».

Mr. Moutier. (In French.) — The plan should give all possible facilities.

Mr. Brisse, French Eastern Railway. (In French.) — In French the word « *organiser* » (to organize) means « to supply with organisms necessary for existence ». It would therefore be necessary that the stations should be provided with organization of the two kinds.

Mr. Moutier. (In French.) — The word « *aménagées* » (arranged) would meet with general approval. (*Agreed.*)

I propose therefore to word the conclusion as follows : « It is advisable that stations should be arranged in such a way that the placing and the withdrawal of wagons may be effected at different times in the same day, also while stations are open to the public. »

— Adopted.

The President. (In French.) — « 4) (renumbered 3). Mechanical equipment, and particularly the use of capstans, add to the efficiency of the lay-out and to the rapidity of shunting. These are of the greatest utility, especially in seaport stations and wherever one has to deal with bulky heavy materials, such as coals or minerals. »

— Adopted.

« 5) (renumbered 4). Specialisation is to be strongly recommended for large goods stations. Separate warehouses should be provided for goods arriving, being dispatched, or transshipped. »

Mr. A. Davies, London & North Western Railway. — I am not a partisan of specialising goods stations. Besides this is not done in England.

Mr. Moutier. (In French.) — This question is the same as that which was

dealt with just now, that is to say that of the special tracks for loading and unloading.

When we talk of different warehouses we say « separate warehouses should be allotted to the arrival and departure of goods as well as for transshipment ». We do not mean to say that there must always be separate warehouses for all the goods of fast and of slow service. Otherwise it would be too definite and in particular contrary to the practice of the French Northern Railway, where a single warehouse with a central track enables goods arriving to be received on the one side by emptying the wagon; the wagon can be filled immediately afterwards with goods delivered by the public to the second half of the warehouse situated on the other side of the central track. The tracks which run outside the warehouse and are empty all through the day so that lorries can back against the warehouse, can receive wagons at night, and the warehouse then works as a tranship warehouse.

Mr. Brisse. (In French.) — I am of the opinion that the second paragraph of this recommendation should be deleted. Actually, there can be no question of laying down an absolute law for the distinction of warehouses for goods arriving, or for goods dispatched or for transhipment.

It would be possible to find a fairly large number of cases in which, owing to favourable circumstances, it is possible to use the same warehouse simultaneously for arrival and dispatch. This is especially the case when the periods of arrival and dispatch are distinct in the station and they do not extend over too long a period of time.

On the other hand, in stations which are important centres for dispatch and in which it is necessary to carry out

transshipment, it is advantageous to be able to make up wagon loads from the goods that have arrived for transshipment and those which have come from the town itself to be forwarded.

Thus, in many of our fairly large installations, we arrange lines for night use alongside the outer platforms to which the wagons bringing goods for transshipment can be brought. The two categories of goods dispatched thus come together with a great advantage to the service.

Mr. Nitesco. (In French.) — I share the opinion of Mr. Brisse.

Mr. Vigna. (In Italian.) — Recommendation No. 5 (now No. 4) contains in its second part a definite statement : the differentiation of arriving and forwarding traffic. Actually the goods on arrival, particularly in large stations, are already separated from the others, and it is useful to be able to receive them in the warehouses that are specially allotted to arrivals; I would say that this is almost necessary in large stations for prompt delivery to the consignees.

On the other hand, the goods leaving and those for transshipment can, or rather should be collected in large stations, for sorting the packages, because, by modifying the arrangement of mixed wagons with a view to making up of new wagon loads for the final destination, it is very useful to comprise in the grouping not only those goods that are in transit, but also those that are being forwarded from the station, in order to obtain either a better utilization of the wagons, or more rapid transport of the goods.

I think, therefore, that the idea should be expressed (which appears to me to be correctly given in the second half of the paragraph), that it is advisable to or-

ganize distinct warehouses for arrival and others for forwarding and transshipping.

Mr. Maison. (In French.) — Let us retain the first paragraph and delete the second. (*Agreed.*)

Mr. Bonnevay, *principal secretary.* (In French.) — The conclusion will, therefore, be worded as follows : « The allotment of special goods stations for different classes of traffic is advisable in some cases. »

— Adopted.

The President. (In French.) — « 6) (re-numbered 5). Fuller use should be made of private sidings, which increase the available capacity of the stations, and are of great assistance to commercial enterprise. »

Mr. Mauldin, Great Eastern Railway, Great Britain. — The flow of traffic in England does not generally warrant the use of separate freight sheds for arrivals, despatches and transshipments. It is considered that our present practice facilitates the movement of traffic both on truck, in shed and by van for collection or delivery. The consolidated working also results in a more economical wagon user.

Mr. Brisse. (In French.) — No difficulty can arise because the two systems in use, the French system and the English system, consist of sidings of a certain length putting the railway in connection with the works of an individual.

Mr. Nitesco. (In French.) — The system is of more general application in France.

Sir Evelyn Cecil, *vice-president.* — In England the sidings are usually asked

for by the private trader, and then laid down by the railway company at his expense.

Mr. Eir. (In French.) — It is true that the private siding constitutes a great advantage to trade, but, so far as the railway is concerned, the contrary is sometimes the case; this depends on the length of the siding. Some of these sidings have very little traffic and nevertheless require complicated shunting operations.

Mr. Moutier. (In French.) — According to investigations made in France 90 % of the sidings show indisputable advantage both for the railway and for trade.

It is therefore advisable that their adoption should be encouraged as much as possible.

Mr. Maison. (In French.) — The idea that it is advisable to extend the use of private sidings as much as possible, as expressed in the paragraph, may be considered from two points of view. When the private siding is already in existence, the point is to give it sufficient length to hold the wagons and to allow shunting to be carried out satisfactorily. This is what is done on the French Northern Railway, but it is not exactly the idea that was in view. The idea under consideration was that of encouraging the installation of private sidings. The question in this respect is of great interest to trade and to the railway, but the text that has been submitted to us requires a reservation. Actually the increase of these private sidings may necessitate supplementary shunting operations on main lines and be the source of great danger, particularly on lines carrying heavy traffic.

I propose to add the following, "but it is advisable, on lines having heavy traffic, that they should be connected to

main siding tracks rather than to main-line ».

This is obvious, but it is well that it should be so stated.

Mr. Brisse. (In French.) — It is always possible to refuse to instal a private siding on a line carrying heavy traffic.

Mr. Vigna. (In Italian.) — The remark that has been made is very true. In the new station installations where the installation of private sidings is anticipated we provide special tracks for serving these. It appears to me, therefore, that it would be sufficient to indicate here "service by special tracks". Now this method solves the question from the operating point of view, provided that the wagons intended for loading do not encroach on the station space and allow for independent shunting to take place for the rest of the service, while at the same time a better service is given.

Mr. A. Davies. — This statement should be modified, because, in England, private sidings are refused in some cases.

Mr. Moutier. (In French.) — We continue to think that it is advisable to encourage the development of private sidings with the reservation, of course, that proper precautions should be taken in arranging them.

Mr. Brisse. (In French.) — As the question refers to goods stations, paragraph 6 should also take account of the sidings connected to goods stations. The point to be dealt with and on which we have to draw our summary, is whether it is better to encourage or to discourage the extension of private sidings in connexion with goods stations as an aid to increasing the output.

Mr. Maison. (In French.) — In stating

that it is advisable to give every encouragement to installing private sidings, the reporters had in view the prevention of too many goods passing through the normal goods station lay-outs and enabling wagons to be run direct to any works that may be constructed. These works are not always arranged near the goods stations but sometimes at a distance of 0.6, 1.2 or 1.8 miles. The reporters think that in this case it is advisable to encourage the connexion of these works with the railway by means of sidings.

Mr. Moutier. (In French.) — The reporters have refrained from going into full detail.

In France the law enables us, on grounds of safety, to refuse to instal sidings branching from the main track. As regards inconvenient sidings such as those that are connected by means of a turntable, these have no legal status. We are therefore adequately protected — and finally we have the power to make an agreement, embodying all the conditions necessary according to the local circumstances, with any individual de-

siring the construction of a private siding.

Mr. Crimail. (In French.) — A manufacturer to whom one might be likely to refuse a private siding might oppose this view by quoting the resolution of the Congress. It is therefore advisable that the paragraph should be modified.

Mr. Bonnevay, principal secretary. (In French.) — It might be worded : « It is generally desirable that private sidings should be greatly increased ». Instead of : « It is advisable to give, etc. ».

Mr. Gufflet, French Midi Railway. (In French.) — In the paragraph there is a statement which does not agree with the body of the report. It is certain that if there are a number of extra lots of wagons to be made up on the various private sidings connected with any goods station, in order that the traffic on each siding taken individually may be reduced to a minimum, there will be a resultant complication in operation without necessarily an increase in the output.

The President. (In French.) — I propose to defer the rest of the discussion till to-morrow. (*Agreed.*)

Meeting held on 21 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — We will now resume the discussion and I will call upon Mr. Maison to speak.

Mr. Maison. (In French.) — I have no intention of opposing the increase of private sidings, which are a great utility from all points of view, whatever may be the distance at which the works they serve

are situated from the station. I think, however, that some reservation should be made.

Mr. Moutier, reporter. (In French.) — There is no need for exaggeration. When an opinion is given, it does not mean necessarily that it will be carried out to its extreme limit. « To increase the sid-

ings » means that these should be constructed according to a rational plan.

We are, moreover, protected in France, so that we can avoid any arrangement that might be undesirable.

Mr. Bonnevay, principal secretary. (In French.) — It has been remarked that this paragraph, if too rigidly worded, might be used against us.

Mr. Maison. (In French.) — In France, the law enables us to refuse the concession for private sidings on technical grounds and for considerations of safety. Now, given a paragraph as definite as that which has been framed by an international Association, it would often prove very difficult to oppose concessions of this kind, when required by considerations of safety, on lines carrying heavy traffic. It would therefore be well to adopt a wording that was less definite and would give power to Administrations to refuse the concession of a siding intended to be connected directly to a main line carrying heavy traffic.

This restriction is necessary.

Mr. Hanrez. (In French.) — I support the observations of Mr. Maison and I will add that in Belgium permission to instal such sidings is always refused.

Mr. Payet. (In French.) — I also support Mr. Maison's point of view.

We have been forced to instal private sidings connected directly to main lines run over by express trains, for reasons foreign to those of the railway.

We are willing to permit the installation of all sidings that are asked for on the condition that they do not interfere with the regular working of the line.

Moreover, I prefer the wording which Mr. Crimail has just submitted to me.

Mr. Crimail. (In French.) — The fol-

lowing is the wording which I beg to suggest : « Private sidings, which are generally a great convenience to the public, can increase the capacity of stations, provided they are justified by sufficiently important traffic, that they are well laid out, and that they connect with the railway in such a way as to facilitate shunting. »

Mr. Maison. (In French.) — The words should be added, « But it is advisable on lines carrying heavy traffic that they should be connected with the station by a main siding ».

I do not wish to trespass on Mr. Moutier's ground, as he is fully qualified to defend the policy of his railway system. I will, however, recall the fact that I have been enabled to examine the schemes relating to the French Northern Railway, which in the case of some stations, do not allow for such large extensions as one might think, for the simple reason that these stations are close to private sidings on which considerable shunting operations take place.

It may, therefore, be said that private sidings, even at a distance, are of use in reducing the shunting operations in adjacent stations, and I am certainly of the opinion that it is advisable to encourage their installation. But it appears to me necessary to supplement this conclusion with the reservation that I have proposed in order to avoid too many private sidings being connected to the main lines of some railways, and to avoid requiring the manufacturers to carry their sidings right up to the station.

Mr. Moutier. (In French.) — I am in agreement with the general views which have been put before the Meeting. The French Northern Railway Company accepts the idea that has been stated by

Mr. Maison in its entirety, that if it is advisable to encourage the construction of private sidings, this is always subject to the condition that they are connected to the main lines by an independent track. I do not think, however, that we should be so explicit in the conclusion owing to the fact that exceptions may occur such as : actual impossibility of doing otherwise; lines carrying light traffic, etc.; of which in France the Minister, who approves all the schemes, would be the judge. It will be sufficient to express the idea and to draw attention to the dangers which are a matter of common knowledge.

Mr. Bonnevay. (In French.) — The wording proposed by Mr. Crimail might be accepted with the addition suggested by Mr. Maison as follows : « It is to be recommended that they should be connected to the station by a main siding... »

Mr. Luuyt, Paris, Lyons & Mediterranean Railway. (In French.) — I do not like the expression : « Main siding », because it implies that there are several sidings branching from a main siding. Now there may be only one.

Mr. Moutier. (In French.) — Let us say « By a track independent of the main tracks ».

Mr. Maison. (In French.) — I wish to insist on the inclusion of the words « on lines carrying heavy traffic ».

The opinion which we wish to modify tends to become too exact in the opposite sense. It is quite incorrect to recommend that private sidings should be connected to a main station. If this line were taken, it would follow that works situated at some distance from the stations would suffer too great an increase in the expense to the manufacturers. It is therefore necessary to retain the words « on lines carrying heavy traffic ».

The President. (In French.) — It would be advisable to be definite, because it would appear that sidings were only to be connected to lines carrying light traffic.

Mr. Maison. (In French.) — Private sidings are advisable for all lines. But the question of connecting them by a special line to the stations is only of importance on lines carrying heavy traffic.

Mr. Vigna. (In Italian.) — It is also possible that a line carrying light traffic may be connected to several works in such manner that, although the traffic is light, the importance of an independent track for connecting it with the sidings is great. It would be sufficient to mention the two possibilities : « When the amount of traffic requires it, or the number of sidings justifies it ».

Mr. Lamalle, Belgian State Railway. (In French.) — Would it not be possible to give satisfaction to all by retaining the text as it has been submitted to us and prefacing it by the words : « Within the limits permitted by working conditions, it is advisable, etc. »

Mr. Crimail. (In French.) — It is my wish that these conditions should be given.

The President. (In French.) — It would be desirable that the wording should not be too strict.

Mr. Vigna. (In Italian.) — I propose the following : « It is convenient to connect these to an independent line, rather than to the main lines, whenever the quantity of traffic or the number of sidings warrants this. » (Agreed.)

The President. (In French.) — The conclusion will then read as follows :

« 5) Private sidings, which are gener-

ally a great convenience to the public, can increase the capacity of stations, provided they are justified by sufficiently important traffic, that they are well laid out, and that they connect with the railway in such a way as to facilitate shunting.

“ It is convenient to connect these to an independent line, rather than to the main lines, whenever the quantity of traffic or the number of sidings warrants this. »

— Adopted.

“ 7) In order to expedite the liberating of wagons, they should be placed at the disposal of the consignee, and advice notes sent out as quickly as possible on their arrival. »

Mr. Moutier. (In French.) — I propose that this paragraph which is unnecessary should be deleted.

— The deletion was approved.

The President. (In French.) — “ 8) Specially arranged rates may be of great use in speeding up the loading, delivery and unloading of goods. »

Mr. Moutier. (In French.) — It would be preferable to say that the influence which the charges might have on the congestion in the stations must not be overlooked.

Mr. Brisse. (In French.) — It is necessary to limit the paragraph to the subject of the question itself. Now paragraph 8 takes account of a class of ideas which, while being of great interest, are not those primarily under consideration : the question has, moreover, already been the subject of investigation at previous sessions. It might to-day be worded as follows : “ The influence which the arrangement of charges adopted immediate-

ly after the war may have on the rapid clearing of the station and of the rolling stock. » This is not mentioned at all in the question which has been submitted to us, and, under these conditions, I do not think that it is necessary that it should be examined within the limits of the definition that is proposed.

Mr. Maison. (In French.) — I agree entirely with Mr. Brisse.

Mr. Moutier. (In French.) — Are you in favour of deleting number 8?

Mr. Brisse. (In French.) — Yes, because this is not a question of installations in the stations. (*Discussions aside.*)

The President. (In French.) — We shall not be able to arrive at an agreement if everybody speaks at once. (*Laughter.*)

Mr. Arrillaga, Madrid, Saragossa & Alicante Railway. (In French.) — In the paragraphs that we have considered, it has not been the question of the delivery of the goods to the public in the stations themselves. This is a question of the organization of the stations which is intimately connected with that of the slow goods service and the use of the rolling stock.

In Spain much space is taken up in removing goods sent by slow goods service. It would therefore be necessary to prevent the public from entering the yards at the stations by delivering the goods on their premises or depositing them in central warehouses in the town.

Mr. Vigna. (In Italian.) — The proposal that has been made to instal central warehouses for the storage of goods within the towns in order to facilitate delivery to the public, has, in my opinion, a serious disadvantage because it requires an amount of absolutely unproductive work.

It would be necessary to take the goods that have been unloaded in the warehouses at the stations and to transport them to central warehouses, a heavy amount of work which would involve the cost of loading, transport and unloading, which can be and ought to be avoided except under quite special conditions.

Mr. Moutier. (In French.) — This is a question of organization the details of which it would be interesting to know and to work out, but it is more closely related to question XI : « The organization of slow goods traffic. »

I will finally ask for the retention of paragraph 8, because at the present time we are considering the output of the stations. Now one of the methods of increasing this output is given in this paragraph and it has given excellent results up to the present time.

Before the adoption of special tariff arrangements for allowing a bonus to be made to consignees who discharge their goods within a limited time, we had thought it would be necessary to double the installations in some of the stations. Since the introduction of these bonus arrangements we have not found the need for so doing.

Such results, therefore, appear to me to have been of as great a value, if not of a greater value, than those which might be obtained by technical methods.

Mr. Lamalle. (In French.) — I share the view of M. Moutier while remarking that under question XI the same idea is dealt with in greater detail. It would, therefore, be better that it should not be considered here.

Mr. Moutier. (In French.) — Under these conditions I will not oppose the deletion of paragraph 8, always subject to the condition that this does not mean that the question will not be dealt with at all.

The President. (In French.) — I will take the vote on the deletion of paragraph 8 in accordance with the condition mentioned.

— The deletion was approved.

Note by a delegate.

Mr. Fiala, Czecho-Slovakian State Railways. (In French.) — I have had the honour of submitting to the President the scheme for a goods station which will be built in the neighbourhood of Prague. I should be grateful to the Meeting if it would give its consent to the mention of this in the report.

Mr. Bonnevay, principal secretary. (In French.) — The shorthand notes of the meeting will include a note on your communication which will be published in the proceedings.

Meeting held on 24 April 1922 (afternoon).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — The following is the summary that has been drawn up as the result of the discussion on question X :

Summary.

« 1° In goods stations the lines intended for loading and unloading should be

connected as far as possible by independent lines to the arrival, departure and shunting sidings;

“ 2° It is advisable that stations should be arranged in such a way that the placing and the withdrawal of wagons may be effected at different times in the same day, also while stations are open to the public;

“ 3° Mechanical equipment, and particularly the use of capstans, add to the efficiency of the lay-out and to the rapidity of shunting. These are of the greatest utility, especially in seaport stations and wherever one has to deal with bulky heavy materials, such as coals or minerals;

“ 4° The allotment of special goods stations for different classes of traffic is advisable in some cases;

“ 5° Private sidings, which are generally a great convenience to the public, can increase the capacity of stations, provided they are justified by sufficiently important traffic, that they are well laid out, and that they connect with the railway in such a way as to facilitate shunting.

“ It is convenient to connect these to an independent line, rather than to the main lines, whenever the quantity of traffic or the number of sidings warrants this. »

— This summary was adopted.

DISCUSSION AT THE GENERAL MEETING

Meeting held on 26 April 1922 (afternoon).

Mr. R. DE CORNÈ, HONORARY VICE-PRESIDENT, IN THE CHAIR.

GENERAL SECRETARIES : Mr. J. VERDEYEN; Mr. E. FRANZA; Sir HENRY FOWLER.

ASSISTANT GENERAL SECRETARY : Mr. N. GIOVENE.

Sir Henry Fowler, general secretary,
read the

Report of the 3rd section.

(See *Daily Journal of the session*, No. 8,
p. 8.)

“ In the absence of Mr. Jullien, special reporter, who was engaged in another section, Mr. MOUTIER (*French Northern Railway*) introduced the question, giving a brief summary of the various reports and putting forward the suggested summary to be submitted to the general meeting.

“ Mr. EIR (*Danish State Railway*) considered it was not always possible to separate the goods traffic from the passenger traffic, as recommended in the report.

“ Messrs. MAISON (*French Government*), VIGNA (*Italian State Railway*), HANREZ (*Belgian State Railway*), CRIMAIL (*Chinese Government*) agreed that such a separation is not always advisable, especially in the case of unimportant stations, or when dealing with fast goods traffic. One cannot lay down hard and fast rules on this point.

“ Mr. PAYET (*French State Railway*) and Mr. EIR pointed out that the special report appeared to recommend separate lines for loading and unloading wagons. This specialisation cannot be recommended in any case.

“ Mr. A. DAVIES (*London & North Western Railway*) said that he was opposed to having different freight sheds for arrivals, dispatches and transshipments. This system was not used in England.

“ Mr. BRISSE (*French Eastern Railway*) pointed out the general advantage of common sheds for loading and transhipments. It seemed beside the point to formulate hard and fast conclusions on the subject.

“ Messrs. BRISSE, VIGNA, NITESCO (*Romanian State Railway*) though agreeing with the reporter as regards the undesirability of hindering the public in the work of loading and unloading by shunting on the lines used for these purposes, believed that it should be possible to do this several times a day, and stations should be organised accordingly.

“ Mr. BRISSE proposed a form of summary which was accepted.

“ The question of private sidings called for the special attention of the assembly.

“ The reporter concluded by stating, the necessity of extending them very widely, to which proposal others gave but a conditional assent.

“ Messrs. EIR, CRIMAIL, GUFFLET (*French Midi Railway*) were of opinion that though private sidings may be of great convenience to the public, they are not always such for the railways, since they often demand complicated shunting and often had but a small traffic.

“ Mr. MAISON requested also that it should be set down that a private siding

can be refused for safety motives whenever it has to be connected directly with the main line.

“ Mr. HANREZ supported this motion, adding that in Belgium such connections are always refused.

“ Messrs. PAYET and VIGNA also supported the motion.

“ The section was unanimous in wishing to insert in the text of the summary some reservations in regard to the importance of traffic, facilities of service and the conditions to be complied with from the safety standpoint. A form of summary by Messrs. Crimail, Maison and Moutier was accepted.

“ After several remarks by Messrs. LUUYT (*Paris-Lyons-Mediterranean*), BALDWIN (*Illinois Central Railroad*), MAULDIN (*Great Eastern Railway*), FIALA (*Czechoslovakian State Railway*) and ARRILLAGA (*Madrid-Saragossa*), the section decided to propose the following. ”

The President. — This is the

Final summary.

“ 1° In goods stations the lines intended for loading and unloading should be connected as far as possible by independent lines to the arrival, departure and shunting sidings;

“ 2° It is advisable that stations should be arranged in such a way that the placing and the withdrawal of wagons may be effected at different times in the same day, also while stations are open to the public;

“ 3° Mechanical equipment, and particularly the use of capstans, add to the efficiency of the lay-out and to the rapidity of shunting. These are of the greatest utility, especially in seaport

“ stations and wherever one has to deal
“ with bulky heavy materials, such as
“ coals or minerals;

“ 4° The allotment of special goods
“ stations for different classes of traffic
“ is advisable in some cases;

“ 5° Private sidings, which are gener-
“ ally a great convenience to the public,
“ can increase the capacity of stations,
“ provided they are justified by suffi-
“ ciently important traffic, that they are

“ well laid out, and that they connect
“ with the railway in such a way as to
“ facilitate shunting.

“ It is convenient to connect these to
“ an independent line, rather than to the
“ main lines, whenever the quantity of
“ traffic or the number of sidings war-
“ rants this. »

— The general meeting ratified this
summary.

SLOW-FREIGHT TRAFFIC

Organization of slow-freight traffic, in order to increase the effective operation of the rolling stock and the lines. Advisability of using, according to circumstances, heavy or light trains, fast or slow trains. Through trains. Pick-up trains, distributing trains. Shuttle services.

Preliminary documents.

1st report (all countries, except America, Belgium, France and Great Britain), by Mr. E. EHRENFREUND. (See English edition of the *Bulletin* of April 1921, p. 377, or separate issue [with red cover] No. 14.)

2nd report (Great Britain), by Sir Herbert A. WALKER. (See English edition of the *Bulletin* of November 1920, p. 731, or separate issue [with red cover] No. 4.)

3rd report (France), by Mr. GUERBER. (See English edition of the *Bulletin* of

June 1921, p. 641, or separate issue [with red cover] No. 17.)

4th report (Belgium), by Mr. U. LAMALLE. (See English edition of the *Bulletin* of July 1921, p. 857, or separate issue [with red cover], No. 21.)

5th report (America), by Mr. W. H. WILLIAMS. (See English edition of the *Bulletin* of August 1921, p. 1087, or separate issue [with red cover] No. 25.)

Special reporter : Mr. U. LAMALLE. (See English edition of the *Bulletin* of April 1922, p. 678.)

SECTIONAL DISCUSSION

Meeting held on 21 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — I will call upon Mr. Lamalle to read a resume of the reports.

Mr. Lamalle, special reporter. (In French.) — Gentlemen, I shall no doubt

be voicing the sentiments of all the delegates in paying a tribute to the memory of Mr. Guerber, chief engineer of the Traffic Department of the Nord Railway Company of France, who was one of the reporters on question XI, and of whose

death we learn with very great regret.
(Unanimous approval.)

As special reporter, I have had to make a resume of the five reports which have been drawn up on this question. You will find this resume, as well as the final summary which I have deduced, in the book containing the special reports, on pages 678 and onwards in the April 1922 number of the *Bulletin*.

I may say that it has been very difficult to draw up a final summary which is based on all the reports, because it deals with questions which are dealt with in different ways in England, in America, and on the Continent. It is therefore necessary in some places to underline the paragraphs which are applicable to some particular country. You will appreciate that it is necessary to deal with it in this way.

The President. (In French.) — I shall no doubt be voicing the wishes of the section in thanking Mr. Lamalle for his valuable contribution. (*Applause.*)

Mr. Hanrez, vice-president. (In French.) — Would it not be as well, before commencing the discussion, to ask Mr. Lamalle if, before Monday morning, he can abbreviate his general final summary, otherwise the discussion will become too wide.

Mr. Brisse, Est Railway of France. (In French.) — I should like to add a remark to the excellent suggestion which has just been made by Mr. Hanrez.

In the first part of the final summary the reporters have dealt with questions of tonnage and the capacity of wagons. The importance of tonnage as affecting the efficiency of transport is a question which does not appear to me to have been included in the reference from the Permanent Commission. This only deals

with the organisation of slow-freight traffic with a view to increasing the capacity of lines and rolling stock.

Under these circumstances I think we should exclude from the final summary everything dealing with the effect of the capacity of wagons.

As far as concerns the utilisation of rolling stock, the problem as it affects a railway administration, is to find out, for a given amount of rolling stock, what is the best organisation to adopt in order to obtain the greatest output from this rolling stock, that is to say, with a view of obtaining per unit vehicle the maximum number of tonne-kilometres transported in a given period, for example, one year.

The reporters cannot have adhered to this view in drawing up their summaries.

Mr. Lamalle. (In French.) — I quite see the point of Mr. Brisse's remarks. However, the five reporters have interpreted the question in the same way as I have, but that does not necessarily say that we were right in doing so. (*Laughter.*)

No doubt it is necessary to try to obtain the highest output from existing rolling stock, but one should also consider whether the existing rolling stock is the most suitable, and thus I think that the question of the utilisation of rolling stock implies an examination of principle to be followed when placing orders in the future.

I must therefore leave it to the section to decide between Mr. Brisse's view and that of the reporters.

Mr. Nitesco, Roumanian State Railways. (In French.) — I propose to adopt both points of view, the final summary of the reporters and also Mr. Brisse's observations.

Mr. Maison, Ministry of Public Works, France. (In French.) — I would support

the view of the reporters who have studied the question. If one only deals with the organisation to be adopted in order to obtain the best results from existing rolling stock, one might imagine that it was merely a question of rates or of train movements, but as has been clearly pointed out by the special reporter, we should bring out in the discussion the general principles to be followed in the future, applying these both to the existing rolling stock and also to future orders.

Seeing that the five reporters have dealt with the question on broad lines, the section can hardly alter the whole of the work.

Mr. Hanrez. (In French.) — One consideration ought to take precedence over all the others, that is to realise that the time we have at our disposal is limited and that soon we shall have exhausted it.

At the rate we are going we shall never finish it. Under these circumstances, is it necessary to go into all the details?

Mr. Payet, French State Railway. (In French.) — It would be as well to have before us the full final summary before continuing the discussion.

I put this to the meeting. (*Hear, hear.*)

Mr. Vigna, Italian State Railways. (In Italian). — I think it would be advisable to appoint a committee of three or four persons so that the proposals may express the principles in a more general manner.

The President. (In French.) — Does anyone oppose Mr. Payet's proposition? (*No! No!*)

We will therefore adjourn the discussion to the meeting on Monday morning. Meanwhile Mr. Lamalle will prepare a new final summary.

Meeting held on 24 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR

The President. (In French.) — We will resume the discussion of question XI dealing with slow-freight traffic.

The following is the new final summary prepared by Mr. Lamalle.:

« *Stock and lines.*

« 1. Within the limits allowed by commercial usage and the maximum load permitted per axle, a general tendency is noticeable towards increasing the tonnage and capacity of wagons.

« On the Continent, the usual tonnage is 20 t.; in America this figure is always exceeded and reaches sometimes 100 tons.

« 2. In order to reduce the trips of

empty stock, most of the railways are endeavouring to restrict the number of types of vehicles.

« With the same object in view, the railways on the Continent have left to private enterprise the construction of vehicles for special purposes.

« 3. The proportion between covered and open wagons necessarily varies with the climate in the different countries and the nature of the traffic to be catered for. As far as possible the railways construct more open wagons, subject to the provision of sheets for loads requiring same. Many railways provide movable sheet supports for sheeting the wagons.

« 4. When railways are divided be-

tween a number of owners in the same country, the « common-user » arrangement of stock has a beneficial effect in the way of reducing the number of empty journeys.

« *Trains.*

« 5. The provision of through and « pick-up » trains is regulated by the volume and the distribution of the traffic.

« The provision of through trains, however, is dependent upon the importance of the traffic and its regularity.

« 6. A tendency is noticeable towards increasing the number of vehicles of goods trains and the figure of 80 is being approached.

« The possible out-put of the railway is increased by the employment of powerful locomotives.

« The use of pilot or banking engines on short inclines, and the employment of two or three engines on steep inclines, is general.

« The speed of these heavy trains is fairly slow. Fast light trains are exceptional.

« 7. Railways endeavour to obtain high average speeds and to realize as far as possible the equality of speeds.

« *Small consignments.*

8. In the organisation of the transportation of small consignments, the attainment of speed must not be detrimental to the best use of the stock.

« The minima imposed in order to ensure full loading vary from 1 1/2 to 3 t.

« The forwarding of wagons on given days only ensures a more efficient use of rolling stock, but necessitates large warehouses and greater care in regard to thefts.

« *Stations and depots.*

« 9. Rapidity in shunting is dependent upon the use of powerful locomotives which have a reserve of power and are worked by men with special knowledge and well-trained.

« More and more advantage is being taken of gravity, either by means of sidings on a slope or by « humping ».

« The allocation of bonuses to the men employed in shunting is of advantage in getting the best out-put from marshalling yards and, consequently, a better turnover from stock.

« *Influence of rates upon the earning power of rolling stock.*

« 10. In order to encourage the public to use stock in a more intensive manner, variable tonnage rates have been fixed according to whether the full tonnage capacity of the vehicle is used or not.

« With the same object, special rates are granted when the loading corresponds to the capacity of several wagons combined or to full train loads.

« 11. With a view to speeding up the unloading of merchandise, the advice notes are sent by the quickest possible means, and many railways inform the consignees by telephone.

« With the same object, demurrage charges are imposed for wagons which are not unloaded within the prescribed time and these charges are calculated in different ways. Some railways do not confine themselves to penalties for time only, but they also take into consideration the weight of the goods to be unloaded.

« The same result is attainable also by granting diminutions of taxes to the traders who unload the wagons in less than the prescribed time. »

Mr. Payet. (In French.) — It is stated in the first paragraph of the final summary that « Within the limits allowed by commercial usage and the maximum load permitted per axle, a general tendency is noticeable towards increasing the tonnage and capacity of wagons ». This is true, but I think it is not without its limitations. As regards the greater part of the traffic which has to be handled on certain French railways, it does not appear to be advisable, except in the case of some special transport, to employ wagons with a greater capacity than 20 t.

The paragraph appears to me rather too wide. It might be sufficient to say « Within certain limits which vary on each railway, etc. ».

Also the words « commercial usage » and « necessities of traffic » do not imply the same thing. Commercial usage tends to affect transport in small quantities, whereas we should like to increase the capacity of wagons.

As regards the 20 t. wagon, it is not likely that this will be exceeded, although we shall reach this figure.

Mr. Lamalle. (In French.) — I agree with Mr. Payet, therefore I have used the expression « Within the limits allowed by commercial usage ».

Mr. Ehrenfreund, reporter. (In French.) — I agree to the remarks made by Mr. Payet, and like him I would prefer to have this paragraph somewhat modified.

As reporter for several countries, I have been able to state from the information which has been supplied to me, that, in general, there is no tendency, except in special cases, to increase the tonnage of wagons beyond a certain limit.

The general final summary does not therefore comply with the information

given by the various reporters. I even think that in saying that there is a general tendency to increase the capacity of wagons, one is making a statement that is not only an exaggeration, but is contrary to the truth. There is on the other hand a tendency for the railway administrations to adopt a special type of wagon having a moderate capacity, neither too great nor too small. It is evident that in practice it is sometimes advisable to have high capacity wagons, especially on trunk lines.

In Italy we have very high capacity wagons up to 40 t., but it should be mentioned that the use of this rolling stock presents a number of difficulties. Wagons of 12, 15 and 16 t. appear to be better adapted to the demands of commerce, and better use may be made of these.

If the section is agreeable, I propose that we should adopt this paragraph of the final summary just as I have worded it in my report.

Mr. Crimail, Ministry of Communications, China. (In French.) — I would like to support the views of the preceding speakers by giving what appears to me an interesting case.

In China it was decided, six months ago, that no more 40 t. wagons should be constructed. It had been intended to follow American practice, but the fact was lost sight of that in China the traffic was in no way similar to that in the new world.

In order to avoid any difficulties of this sort we should, in my opinion, lay stress upon the fact that a considerable and continual increase above 40 t. rolling stock is not always desirable.

Mr. Lamalle. (In French.) — I am by no means advocating the 40 t. wagon for use in Belgium for example. I simply

wish to say from consideration of past practice that I have to report an increase in the capacity of wagons. Perhaps I have expressed myself badly.

In saying that on the Continent the usual capacity of open wagons and closed wagons is 20 t., I had no intention of recommending the use in Europe of larger tonnage for general merchandise.

One might say « it may be said that the usual present day capacity which is about 20 t. has increased ».

Mr. Tatlow, Midland Railway, Great Britain. — A special Committee appointed in England to report upon the type of rolling stock to be built in the future for the conveyance of general merchandise and mineral traffic selected for adoption an open wagon of 12 t., and this recommendation has been generally adopted.

Sir Evelyn Cecil, vice-president. — Wagons of 12 t. are recommended for general and common use, but the use of wagons of a heavier tonnage is not excluded.

Mr. Maison. (In French.) — In France there is a tendency to increase the capacity of wagons. It is true that it is only a tendency, but it is too much to say that the normal tonnage is 20 t. There will still be 10 t. wagons for a long time.

This tendency to increase the capacity of wagons depends essentially on the nature of the traffic, this varying on different railways. On some railways the tendency to reach 20 t. is much in evidence for conveyance of heavy materials; in some exceptional cases wagons as large as 40 t. or even 50 t. may be used.

It is therefore an exaggeration to say that in the case of France present day traffic is carried in wagons which average 20 t. capacity.

Mr. Lamalle. (In French.) — Could

we not agree upon the following text : « It may be said that the capacity of rolling stock has increased, but on the Continent, high capacity wagons are reserved for special classes of traffic ».

Mr. Watson, London & North Western Railway. — I propose to adopt the words « within the limits allowed by commercial usage, etc. », that is to say the first paragraph of the conclusion. The whole of this discussion is useless as the tonnage differs from one country to another.

Mr. Nitesco. (In French.) — I agree with Mr. Maison. In Roumania, open 20 t. wagons are used for coal traffic, and covered 20 t. wagons for the transport of salt, and 25 and 40 t. wagons for sawn and unsawn timber and for cereals.

Mr. Payet. (In French.) — I have two remarks to make, the first corresponds to what Mr. Maison has just said as regards the tendency in wagon building in the future.

We are going to adopt the 20 t. wagon, and we shall abandon the 10 t. type.

What is the reason that has led us to take this decision ? It is that 20 t. wagons are also useful for carrying material which is relatively light but which occupies a large amount of space. This size of wagon is better suited to our needs, and it may be said that in France the tendency of the railways is to adopt the 20 t. capacity.

I have also a second observation.

I think that the reporter has not quite understood what I said a little while ago.

The paragraph in the final summary says « Within the limits allowed by commercial usage, etc. ». I prefer rather to mention traffic necessities, because commercial usages are very often out of date methods and should be changed.

We may take an example in France. Fifteen or twenty years ago we had at Caen, at a certain season, an important traffic in apples for cider making. We carried on an average 5 to 6 t. in a wagon. By means of a change in the rates we have been able to effect this transport in 20 t. wagons, but which only hold 10 t. as regards their actual load, so that during last season 350 000 t. of apples were carried, the average load per wagon being 11 t.

We have thus been able to get twice as good a utilisation of our rolling stock by modifying the rates and by getting traders to fall in with this method.

It is therefore preferable not to mention commercial usage, but to insist above all on traffic considerations. That is the correct way of considering the problem.

Mr. Lamalle. (In French.) — I agree with Mr. Payet that one should try to improve commercial usage, but I would add that this must be done gradually.

When the Belgian State Railway adopted 20 t. wagons it met with many objections on the part of the traders. It was only when these were granted a slight reduction in rates, that they changed their views and become favourable to the 20 t. wagon.

In my opinion we should not delete this portion of the paragraph : « Within the limits allowed by commercial usage », because one must not come into conflict with this usage.

Mr. Maison. (In French.) — Put « by commercial usage and traffic necessities ».

Mr. Ehrenfreund. (In French.) — We might perhaps adopt from a general point of view what I said previously. It is of great importance that the Congress should point out the tendency which

exists to adopt a moderate tonnage for goods wagons.

I would therefore ask Mr. Lamalle to make a slight amendment to his last proposal as follows : « there is a noticeable tendency towards adopting a capacity of 16 to 20 t. as best meets the requirements of the different kinds of traffic ».

It is important to fix a uniform figure, because the capacity differs in different countries.

Mr. Watson. — I propose the division of the conclusion into two parts the first of which would be a general conclusion. It would be worded as follows : « Within the limits allowed by commercial usage and by the maximum permissible axle load, there is a general tendency to increase the tonnage and capacity of wagons. »

The second part would consist of Mr. Ehrenfreund's proposal : « On the continent there is a tendency towards a tonnage of 16 to 20 t. which is more in keeping with the different kinds of transport. »

Mr. Payet. (In French.) — The first part of the paragraph should be modified as proposed by Mr. Lamalle, so as to state that railway administrations have had a tendency to increase the capacity of wagons. The English say that they are limiting this to 12 t., and the French say they are not going beyond 20 t.

I think that in saying that the administrations have had a tendency to increase the capacity of wagons, we should be in keeping with the results of the discussion which has just taken place, and with the experience of all present.

Mr. Watson. — The words « usages commerciaux » translated into English form an expression which it is difficult

to understand and I propose to replace them by « usages économiques ».

Mr. Lamalle. (In French.) — In order to be concise, one might say : « It should be noted that in general, wagon capacities have increased, and there is a tendency to limit this to a figure which varies in different countries. It ranges from 12 to 20 t. on the continent. » This covers the whole range from the least, which is the English 12 t. wagon, up to the maximum, which is the Belgian or Italian 20 t. wagon.

Mr. Watson. — I agree.

The President. (In French.) — I put to the vote the first part of this paragraph worded as follows :

“ Within the limits allowed by traffic conditions and by the maximum permissible axle load, there is a general tendency to increase the tonnage and capacity of wagons. »

— Adopted.

The President. (In French.) — As regards the second part, Mr. Maison proposes the following wording :

“ In Europe preference is given for a tonnage of 12 to 20 t., and in special cases, for certain heavy goods, of higher capacities of 40 to 50 t. In America this tonnage is always exceeded, and is sometimes as great as 100 short tons. »

— Adopted.

2° « In order to reduce empty wagon mileage, the administrations attempt as far as possible to limit the number of types of wagons.

For the same reason, on the Continent the railways leave the construction of wagons for special purpose to private enterprise. »

— Adopted.

3. « The proportion between covered and open wagons necessarily varies with the climate in the different countries and the nature of the traffic to be catered for. As far as possible, the railways construct more open wagons, subject to the provision of sheets for loads requiring same. Many railways provide movable sheet supports for sheeting the wagons. »

Mr. Nitesco. (In French.) — Mention is made here of the relative number of open and covered wagons. It should give the number of wagons per kilometre.

Mr. Lamalle. (In French.) — The number depends on the traffic.

Mr. Nitesco. (In French.) — This is exactly the reason I have raised this question. Would the number of wagons per kilometre thus depend upon the climate ?

Mr. Lamalle. (In French.) — It only appears here as a ratio.

Mr. Morse, Pennsylvania Railroad. — The proportion between closed cars and open cars is based more on the commodity to be transported than the climate, as cars are all interchangeable between the various roads and the territory is such that there are extremes of cold and heat, wet and dry climates, through which the cars are liable to pass. The western roads generally construct more closed cars than open cars, because they have grain and similar commodities to transport, while the roads on which the mineral freight originates construct a larger proportion of open-tops. Sheets or awnings are not used in the United States.

Mr. Vigna. (In Italian.) — I believe that the first part of paragraph No. 3 expresses one of those general rules which are altogether a matter of common sense and which may always be understood.

One may, for instance, very readily appreciate that the capacity of wagons naturally depends upon the country and nature of the traffic.

Since we are dealing with the proposition of a general nature, I think it may be deleted. The third paragraph should therefore commence with the words « As far as possible, railways are constructing more open wagons, etc. ».

Mr. Payet. (In French.) — Mr. Vigna thinks that it is unnecessary to retain the first part of the paragraph because it has a general bearing and because it also applies to various other matters, as well as to the axle load and capacity of rolling stock.

We should commence with a definite statement, such as is contained in the second paragraph.

Mr. Lamalle. (In French.) — I have no objection to this.

Mr. Payet. (In French.) — Mr. Vigna proposes to say : « European railways are building more open wagons, the loads being protected by wagon sheets. »

Mr. Henry-Gréard, Paris-Orleans Railway. (In French.) — I support Mr. Vigna's proposal.

Mr. Watson. — In Great Britain, experience has shewn that the open truck is generally more suitable than the covered truck to the character of the traffic to be conveyed, and sheets are used extensively with open trucks to cover traffic requiring protection.

The number of open trucks on the British Railways is considerably higher than the number of covered trucks.

Mr. Morse. — In America sheets are not used and, consequently, this part of the conclusion does not interest the railways of the New World.

The President. (In French.) — That is the reason why « European railways are specified ».

If no one else wishes to speak, I put to the vote the following text, which appears to be satisfactory to everybody :

« There is a tendency among European railways to construct more open wagons, the contents being protected by sheets.

A number of railways facilitate the sheeting of wagons by providing movable supporting bars. »

— Adopted.

4. « In cases where there are several companies working the lines in the same country, the « common user » utilisation of stock has a beneficial effect in reducing the empty wagon mileage. »

Mr. Luuyt, Algerian Railways of the Paris-Lyons-Mediterranean Company. (In French.) — I propose to combine paragraphs 2 and 4 which express similar ideas.

Mr. Vigna. (In Italian.) — If it is proposed to combine paragraphs 2 and 4 because they both deal with empty running, then the text of paragraph 4 only mentions a part of the results obtained.

Article 4 says, in effect, that when the railways of any country are divided up between several companies, common use of rolling stock is beneficial as a means of reducing empty running.

This reduction in empty running is no doubt one of the advantages obtained, but beyond this one avoids all the reloading from wagon to wagon which is often very costly.

It therefore appears to me preferable not to definitely specify the results.

To summarise, the advantage of common-user rolling stock and its exchange between various administrations is ob-

vious; this being the case, it is unnecessary to mention the reduction in the amount of empty running, since there are also other advantages which are still more important, such as the avoidance of reloading from wagon to wagon.

Mr. Payet. (In French.) — Mr. Vigna thinks that it is necessary to modify the fourth paragraph of the final summary because there are several other reasons in favour of the adoption of this method of utilising rolling stock.

Allow me to make a remark on this subject : The wording of this paragraph may lead to misunderstanding, because the words « common usage of rolling stock » may be taken in two ways. The correct expression in my opinion would be « interchange of rolling stock », that is to say that the wagons belonging to one railway should pass directly and without any difficulty on to another line. On the other hand, the expression « common use of rolling stock » may also be taken in the sense that the railway administrations have a common wagon stock. These are two different things.

At the present time there are some administrations which think that a complete pooling of stock is desirable, while others consider that it is sufficient to interchange their stock. We should therefore use the word « interchange ».

Mr. Hanrez. (In French.) — We should delete the words « in the same country » because the question may perhaps have an international importance.

Mr. Payet. (In French.) — Mr. Hanrez's point bears out what I have just said.

Mr. Lamalle. (In French.) — The reason why I said « when in one country the railways are divided up among several companies, the utilisation of roll-

ing stock, etc. » is that in England they have come to an arrangement among the companies, and common use is made of the rolling stock. This is a method that I wish to draw attention to.

Perhaps the English delegates may give some information on this question.

Mr. Tatlow. — Before the war, each Company used its own rolling stock, and if a wagon of one Company worked over the line of another Company, the latter Company had to pay the Owning Company certain mileage and demurrage charges varying according to the distances run and the number of days it was detained. When the war started, the Government took possession of the railways, and it was agreed that the general wagon stock of the whole of the companies should become common-user stock, and this arrangement operates today.

Mr. Nitesco. (In French.) — The same system was in use in Russia before the war.

Mr. Luuyt. (In French.) — It would be better to delete paragraph 4, because this question is now being dealt with by the 4th section.

Mr. Lamalle. (In French.) — We are in agreement then to say that common use of rolling stock has a beneficial effect on the efficiency of utilisation. (*Hear, hear.*) I do not see why we should not discuss this question here, because it may be also discussed by another section.

At any rate, I feel strongly that this paragraph should stand.

Mr. Payet. (In French.) — If we retain this paragraph, we run the risk of finding that we have come to a different conclusion to that which may have been taken by the 4th section, because there are some administrations which

are not in favour of pooling their stock. Interchange of rolling stock is another matter.

Mr. Nitesco. (In French.) — That point can be settled at the general meeting.

Mr. Lamalle. (In French.) — Since we cannot come to an agreement I will not press the point, and am agreeable to it being deleted.

Mr. Watson. — I should like to see No. 3 given to this conclusion instead of No. 4 because it enters into the same order of ideas as the second.

Mr. Nitesco. (In French.) — On the railway that I represent, the question of the distribution of empty stock is a very important one. I think this is universally the case. While we are dealing with empty stock we should express the desire to deal with this question of empty stock at the next session of the Congress.

The President. (In French.) — That is a matter for the Permanent Commission.

As no one else wishes to speak, I put the deletion of paragraph 4 to the meeting.

— Adopted.

5. « The provision of through and « pick-up » trains is regulated by the volume and the distribution of the traffic.

« The provision of through trains, however, is dependent upon the importance of the traffic and its regularity. »

Mr. Nitesco. (In French.) — Do not some companies use trains which only pick up or detach wagons? Do not the trains which detach also pick up wagons en route, and do not the pick-up trains also detach wagons en route?

Mr. Moutier, Northern Railway of France. (In French.) — This is a matter in which the organisation depends on circumstances.

It is clear that if we increase the number of through trains and trains for special traffic, the efficient use of motive power may be seriously affected, seeing that this is at its best when as many full trains as possible are run from one marshalling yard to another.

In the Autumn and in the Winter, when the number of express passenger trains on the Northern Railway is reduced to a minimum and in consequence the largest number of paths are left available in the timetable, one may use a larger number of these paths for slow freight trains. It is just at this time of the year that the goods traffic is at its maximum, and when it is necessary in consequence to make the best use of the rolling stock. Everything is done in order to move these wagons quickly, whether loaded or unloaded, and the method which is adopted is that of having special trains which start out perhaps only partially loaded and which stop as little as possible en route.

We therefore have on the Northern, in addition to the through trains, trains which exclusively pick up and detach throughout the whole of the length of the line, so that the time lost at wayside stations is reduced to a minimum, and which only have a full load over a portion of their journey.

For example, a detaching train from Lille to the Paris district runs as a through train with its engine power fully utilised as far as Longueau, from whence it continues its journey detaching wagons at all the stations to which the goods which it is carrying are consigned (and naturally it no longer has a full load). Inversely, a train which picks up only, starts from one end of its journey and

only picks up, at the stations along the first part of its journey, the goods which are consigned to its destination, the train being fully loaded during the second part of its journey.

Thus, rapid movement is secured, though it is true at the cost of efficiency in the use of motive power, which is greater or less according to the care used in determining the number of trains, the through timings and the districts in which they collect or detach and in which they run as through trains.

In Summer on the other hand when the passenger trains become more numerous and slow freight traffic is less, it is necessary to reduce to a minimum the number of goods trains by loading these to their full capacity, and in consequence we avoid this method of working.

The sorting and marshalling sidings are fully occupied because of the large number of wagons to be shunted and found accommodation for a longer time, without however exceeding the legal limits.

Mr. Nitesco. (In French.) — I propose to say « Trains of operation ».

Mr. Lamalle. (In French.) — This question has been dealt with in a different way in the reports, and this is the reason why I have arrived at this general phrase which should be agreeable to everybody : « The provision of through and « pick-up » trains is regulated by the volume and the distribution of the traffic. »

It is difficult to put this in any other way.

Mr. Pretorian, Roumanian State Railways. (In French.) — I propose to add to the proposed text the words « and trains which pick-up or detach » since the number of these trains is larger than that of the special trains.

Mr. Maison. (In French.) — I support Mr. Pretorian's proposal. In France these trains are known as « trains-omnibus » or « trains de détail », they pick up and detach wagons.

Mr. Vigna. (In Italian.) — I propose to delete the second part because this idea of through trains is obviously included in the first part.

The President. (In French.) — As no one else wishes to speak, I put to the meeting paragraph 4 (No. 5 in the proposed list).

— The first portion was adopted and the second portion was deleted.

6. « A tendency is noticeable towards increasing the number of vehicles of goods trains and the figure of 80 is being approached.

« The possible out-put of the railway is increased by the employment of powerful locomotives.

« The use of pilot or banking engines on short inclines, and the employment of two or three engines on steep inclines, is general.

« The speed of these heavy trains is fairly slow. Fast light trains are exceptional. »

Mr. Crimail. (In French.) — It is said in the text that as many as 80 sometimes is reached. This figure is often exceeded, especially in America where I have seen trains of 110-40 t. wagons.

Mr. Lamalle. (In French.) — It is about the figure stated in Europe.

Mr. Tatlow. — The loading in England varies from 40 to 100 wagons, according to the nature of the traffic and the gradients of the line run over.

Mr. Watson. — In England there is a tendency for the number of vehicles per

goods train to increase and whilst in particular cases the number approaches 80 vehicles on one train, this cannot be laid down as a general principle.

Mr. Pretorian. (In French.) — Would it not be preferable to give the number of axles rather than the number of vehicles ?

Mr. Lamalle. (In French.) — I propose to delete the words « the figure of 80 is being approached ».

— This deletion was approved of.

The President. (In French.) — « The possible out-put of the railway is increased by the employment of powerful locomotives. »

Mr. Maison. (In French.) — « This is so obvious that the paragraph may be deleted.

— This was approved.

The President. (In French.) — « The use of pilot or banking engines on short inclines, and the employment of two or three engines on steep inclines, is general. »

Mr. Watson. — The use of banking engines is resorted to so as to permit of the train load being maintained, and I propose that this reason be added to the paragraph.

Mr. Morse. — There are two kinds of grades — one a momentum grade, which can be negotiated without the use of a helper, if the train is permitted to approach the grade with sufficient speed to enable it to pass over. On other grades helping engines are generally used when a decrease in tonnage is more than sufficient to cover the cost of a helper — In other words : The ruling grade over a Division without a helper may cause so slight a reduction in tonnage that it might

not warrant the expense of a helper; on other Divisions the grade may be heavy enough to permit a heavy loading of a train over the entire Division with the assistance of a helper over a short distance. It is all reduced to a comparison of costs.

Mr. Vigna. (In Italian.) — The third line begins with the words « The use of assisting engines on short gradients is general ». Cannot assisting engines be also used on long gradients? Is not double heading the same as an assisting engine? This should be made more clear. The same line continues « two or three engines may be used on lines with heavy gradients ». I think that the point which it is desired to make is not clearly expressed. It should include another point which is not very well put.

Mr. Payet. (In French.) — Mr. Vigna points out that this wording may lead to confusion. As a matter of fact it is said that the use of assisting engines on short gradients is general, while further on it mentions the use of two or three engines on lines with heavy gradients.

Assisting engines are placed at the tail of a train and are only used on short gradients. The text should therefore be changed.

Mr. Lamalle. (In French.) — One should replace the word « heavy » by « long ».

In saying that the use of assisting engines on short gradients is general, I had in mind a line which is mostly level which has at one point a short gradient, which makes it necessary to employ an assisting engine.

This is not the same thing as is dealt with in the second part of the text. In this case I had in mind, a line such as that from Brussels to Luxemburg, which

consists of a succession of heavy gradients, 1 in 63, and for which two or three engines are needed over the whole of the section.

Mr. Nitesco. (In French.) — One might say « heavy and long gradients ».

Mr. Vigna. (In Italian.) — After such a clear explanation, I think the point is as follows : it is advisable to maintain as far as possible the load of trains at a constant figure irrespective of the character of the road. One may employ double heading and banking on lines with short gradients as well as with long gradients, but the end in view is to maintain a constant capacity as far as motive power is concerned.

Mr. Pretorian. (In French.) — In order to ascend a heavy gradient, it is necessary to employ assisting engines. Where there are a succession of inclines these are not always so steep.

Mr. Lamalle. (In French.) — The word « heavy » explains why I have employed the term « two or three engines ». There are inclines which consist of a succession of heavy gradients which make it necessary to employ three engines.

Mr. Schiavon, Italian State Railways. (In Italian.) — The point we have to examine is not to determine whether it is necessary to employ two or three engines. The essential thing to which Mr. Vigna has alluded is that in working the regular railway traffic, it is necessary to maintain the load which can be hauled at a constant figure. We have to ensure that the motive power is fully utilised, both on lines through level country and also on heavy gradients. That is a point I think it is necessary to clear up in the first place. This having been settled, it follows that the method of obtaining this object, that the load should remain constant, is to

use banking engines for short gradients on lines through level country, and on lines through hilly country, two or three engines, whether at the head or tail of a train. It is really very simple. It is necessary, however, to state in the first place that the different railways aim at fully utilising engine power.

Mr. Payet. (In French.) — Mr. Schiavon has pointed out that we should attempt to maintain a constant tonnage which is at as high a figure as possible, but since we have to deal with level lines and lines with varying gradients, we should, in order to obtain this end, employ banking engines for short gradients and assisting engines either at the head or tail of a train for lines with heavy gradients.

Mr. Watson. — I propose to word the text as follows : « In order to maintain the load, the use of banking engines on short inclines is general; it is the same, etc. »

Mr. Lamalle. (In French.) — At previous meetings it has always been said that our conclusions should be concise. When we say that « use of banking engines on short gradients is general » we all know what we wish to express. This is hardly so as regards the second part of the text.

Mr. Pretorian. (In French.) — One might say « The use of two or three engines on lines with heavy gradients is general, according to the profile of the line, in order to maintain a constant loading. Assisting engines are to be recommended for heavy gradients ».

Mr. Lamalle. (In French.) — Will not the following text be agreeable to all of us?

« In order to maintain a constant load,

the use of assisting engines on long or heavy gradients is general, etc. »

Mr. Maison. (In French.) — I am absolutely in agreement with Mr. Lamalle as regards this text. I ask him, however, to agree that his text should be completed as follows : « On lines with long and heavy gradients or with an undulating profile. » This as a matter of fact is a case which often arises. There are sometimes inclines which are relatively short but of which there are a large number.

Mr. Nitesco. (In French.) — In our country we have a large number of such cases. There are lines on which there are a large number of inclines, and to operate these one uses banking engines stationed at each of these.

Mr. Schiavon. (In Italian.) — We have agreed on the essential point that the hauling capacity should be kept constant on all portions of the line, and I am glad that the section has come to this decision. This is a very important point.

As regards the second part of the proposed paragraph, I accept the reporter's statements, but I should draw attention to one thing. The reporter has just stated very clearly that there are so to speak two kinds of assisting engines. My point he says is this : on certain lines in level country one meets with a gradient at one particular point, and here an assisting or banking engine is employed. There are also lines with an undulating profile (or a number of successive gradients). I propose that we should accept the statement of the reporter in which he says that « the use of banking engines is now general on short gradients on lines in level country ». The same is true of the double or treble heading on lines with heavy gradients. I would therefore only add the words « lines in level country »

in order to make more clear the reporter's meaning.

Mr. Lamalle. (In French.) — As we have also to consider the case of a line in level country with a slight but lengthy gradient, the expression « lines in level country » appears to be too general. I propose the following text :

« In order to avoid the necessity of reducing the load below the normal, the use of banking engines on steep gradients is common practice, and two or three engines are used to work trains over lines with long and heavy gradients or through undulating country. »

— Adopted.

The President. (In French.) — « The speed of these heavy trains is fairly slow. Fast light trains are exceptional. »

Mr. Lamalle. (In French.) — This paragraph is intended to draw attention to the fact that practice tends towards heavy trains.

Mr. Watson. — In Great Britain the general aim is to minimise uneconomical light running of trains, and thus increase the average train load.

Mr. Luuyt. (In French.) — One should say « trains » instead of « these trains ». —

— This paragraph as amended was adopted.

The President. (In French.) — 7. « Railways endeavour to obtain high average speeds and to realize as far as possible the equality of speeds. »

Mr. Watson. — I propose to say : « It is desirable to obtain the greatest possible average speed, with the maximum tonnage for trains and the time-table is arranged so as to obtain the best use of the lines ». —

Mr. Lamalle. (In French.) — Mr. Vigna asked me to explain this paragraph. The following is what I have said in the special report :

« An effort should be made to obtain higher average speeds — not so much by fast running on route, as by shortening the length of time at stopping stations.

« High speed in transportation does not always result from following the shortest route, because better results can frequently be attained by diversion which allows of advantage being taken of connections with more direct trains; or by making use of easier stretches of the line.

« With a view to getting the best possible value out of the track, it is desirable that there should be very little difference in the speed of trains, and that, in particular, the average speed of slow passenger trains should be the same as that of through goods trains. »

We have here the whole of the con-

siderations which have been summarised in a more concise form in the text which has been submitted to the section.

Mr. Vigna. (In Italian.) — I have to thank Mr. Lamalle for the explanation which he has given, and I would add that in this case, while maintaining the maximum loading, one obtains a good commercial speed by organising the freight traffic in such a way that for main line trains stops at intermediate stations are as far as possible avoided.

Mr. Bonnevay, principal secretary. (In French.) — The following is the final text as proposed by Mr. Watson :

« It is desirable that transport should be as rapid as possible, provided trains are loaded to their maximum tonnage.

« The working time-table should be arranged so as to take full advantage of the carrying capacity of the lines. »

— Adopted.

Meeting held on 25 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT, IN THE CHAIR.

The President. (In French.) — We now come to paragraph 8 of the final summary on question XI on slow-freight traffic, the first part of which is as follows :

« In dealing with goods in small quantities, rapidity of transport should not be obtained to the detriment of the economical use of rolling stock. »

Mr. Epinay, Paris-Orléans Railway. (In French.) — It should be stated that the running time allowed on railways is sometimes very much reduced in order to be able to obtain full use of the rolling stock.

We have here three factors to consider : the economical running speed, the time taken in transporting goods and the utilisation of rolling stock. These are the points which should appear in the paragraph.

Mr. Maison. (In French.) — The text should be read with due consideration of the time limits allowed in transport. Also, the proposed text assumes that this is within the legal time limits which obtain in each particular country.

It should be stated that fortunately in

France and in other countries the legal time limits are not always reached.

Mr. Payet. (In French.) — I associate myself with what Mr. Epinay has said, and ask that the words « within the legal time limits » should be added.

Mr. Lamalle. (In French.) — I would like to know where it is necessary to include the words « within the local time limits ».

I would say that Mr. Maison has well expressed my meaning by saying that the text ought to be interpreted with due reference to the legal time limits.

Mr. Epinay. (In French.) — Let us say « within the legal time limits ».

Mr. Maison. (In French.) — I propose that we retain the text as proposed by Mr. Lamalle. It is useless to add « within the legal time limits » because no administration can fail to comply with these.

Mr. Payet. (In French.) — This addition is necessary because the impression should not be given that we are always able to reduce these times.

Mr. Lamalle. (In French.) — To resume at Mr. Epinay's remark. We should add « with the understanding that the legal time limits must be observed », but this is perhaps unnecessary because no one can infringe these regulations.

Mr. Payet. (In French.) — It is necessary to look at this problem from two points of view. It must be realised that the efficient utilisation of rolling stock and rapidity of transport are two different things. I am obliged to make allusion here to a special situation which is of importance in France in which, of all countries, the shortest times are allowed.

Mr. Lamalle. (In French.) — In order that we may all agree, I propose to add « it is assumed that the legal time limits are to be adhered to ».

Mr. Ehrenfreund. (In French.) — On principle I do not object to this addition. I think, however, that it is superfluous in view of the explanations given by Mr. Lamalle.

The President. (In French.) — I put to the vote the first paragraph with the addition proposed by Mr. Lamalle.

— Adopted.

« The minimum load for which a separate wagon may be obtained is fixed at a figure ranging between 1 500 and 3 000 kgr. »

Mr. Loney, Midland Railway, Great Britain. — I should like to point out that in England a tonnage of 1 000 kgr. is considered as sufficient to send a wagon direct. 1 500 must therefore be replaced by 1 000.

Mr. Lamalle. (In French.) — In proposing this text, my object has only been to call attention to the effect upon rapidity of transport. There has been a tendency to hold back transport in order to have wagons as fully loaded as possible, as is shown by Mr. Ehrenfreund.

Mr. Nitesco. (In French.) — Are there any other countries where the minimum is as low as in England ?

Mr. Lamalle. (In French.) — In Belgium the minimum is fixed at 2 000 kgr.

Mr. Nitesco. (In French.) — In Roumania the figure is 1 500 kgr.

Mr. Lamalle. (In French.) — I support the proposal of the English de-

legates to reduce the minimum to 1 000 kgr. and to say 1 000 to 3 000 kgr.

Mr. Nitesco. (In French.) — This minimum only exists in England.

Mr. Pretorian. (In French.) — The meaning of the word « obtained » appears to me very restricted.

Mr. Payet. (In French.) — There is a point which is not brought out in the discussion.

It is to be understood that we are dealing with wagons containing small consignments loaded by the railway and not by the public. (*Agreed to.*)

Mr. Lamalle. (In French.) — The text says in the first paragraph « goods transport in small quantities ». It is dealing with wagons loaded by the railway staff. The question of « grouping » comes later.

Mr. Crimail. (In French.) — The word « obtained » is outside the question and should not be retained.

Mr. Maison. (In French.) — I agree with this opinion. The same applies to the word « fixed ». Fixed by whom?

Mr. Lamalle. (In French.) — By the railway administration itself, in its instructions to its staff.

Mr. Maison. (In French.) — We should say « The minima adopted by the administrations for the utilisation of rolling stock ». (*Discussion.*)

Sir Herbert A. Walker, reporter. — I propose we substitute the word « direct » for the word « complet » in the French text, because in England a wagon having a load of one ton is sent directly to its destination.

Mr. Lamalle. (In French.) — I pro-

pose to say « The minima adopted by the administrations for loading goods in small quantities varies between 1 000 and 3 000 kgr. ».

Mr. Maison. (In French.) — Would it not be preferable to word the text as follows : « In order to consider a wagon containing small consignments as being a complete load, the minima adopted by the administrations vary between 1 000 and 3 000 kgr. ».

Mr. Ehrenfreund. (In French.) — I must ask the meeting not to lose sight of the importance which this paragraph may have in forming public opinion. This wording may be inadvisable, especially in Italy where our ordinary wagons are 18 to 20 t. A station may thus despatch under certain difficult traffic conditions a wagon of goods in small quantities containing 3 000 to 4 500 kgr.

However, if the public were to learn that in a resolution of the Congress the administrations consider that a tonnage of 1 500 kgr. is sufficient to make a complete wagon load, they would be very surprised.

Wording such as is proposed would be inadvisable, as far as Italy is concerned, as regards the utilisation of rolling stock.

I therefore ask the section to give this careful consideration before coming to a decision.

Mr. Lamalle. (In French.) — In my opinion we are only dealing here with goods to which the ordinary rates are applicable. When we speak of « grouped consignments » we are dealing with special rates.

I do not think that Mr. Ehrenfreund's fears are justified, and we may therefore adopt Mr. Maison's text.

Mr. Henry-Gréard, Paris-Orleans Railway. (In French.) — I agree with

Mr. Ehrenfreund, and ask that no mention should be made of the minimum tonnage.

Mr. Vigna. (In Italian.) — I think the proposed wording is well drawn up. I would propose, however, to definitely state the object in view. One might say « In order to accelerate the transport of goods in small quantities, railway administrations consider as being sufficient to form a complete wagon load a tonnage which varies from 1 000 to 3 000 kgr. » The whole object here is to accelerate the transport of the goods. Where administrations consider a wagon as sufficiently loaded when it contains 1 000 to 3 000 kgr., this is solely with the object of speeding up its departure in order to render the transport of goods more rapid. If the object is stated, the proposed wording becomes clear.

Mr. Lamalle. (In French.) — I do not think it is necessary to say that this is done with the object of obtaining greater rapidity of transport, for if a wagon is considered loaded when it contains 1 000 kgr., this wagon would be able to be despatched more quickly than if it had to wait until its load reached 2 000 or 3 000 kgr.

Mr. Crimail. (In French.) — It is a matter of justifying ourselves in the eyes of those who might criticise the use of wagons so lightly loaded.

Mr. Maison. (In French.) — We have here two objects which are more or less conflicting : the efficient utilisation of rolling stock and rapidity of transport.

From the point of view of the efficient utilisation of rolling stock, one may say that a wagon of goods in small consignments would not be considered as fully loaded until it contains its maximum load. In this case, however, one would

considerably increase the time taken in transport. If on the other hand the wagon is despatched with a load of 1 000 kgr., transport would be more rapid, but the utilisation of rolling stock would be very poor.

The railway administrations have had to make a compromise in their desire to make as good a use as possible of their rolling stock, and at the same time to accelerate transport. One might perhaps add to the text which I have proposed « With a view to making good use of the rolling stock as well as to accelerate transport, etc... ».

Mr. Hanrez. (In French.) — Take the case of a wagon loaded with 800 kgr. which should be despatched to-day to its destination. The station would be able to send away the same, but there are four days allowed by law in which to do this, and it might be said : « By holding back the goods until tomorrow and by adding those which may be handed in in the meantime, there may perhaps be 2 000 kgr. to despatch in this wagon. The goods in this case would not arrive till the day after, but even then would be within the legal time limit. »

In this way better use would be made of the rolling stock, while at the same time conforming to the legal time limits.

Sir Herbert A. Walker. — In England, the minimum of one ton is enough to obtain a direct wagon to destination without transhipment. I emphasise the importance of avoiding transhipments from the point of view of delays, maintenance costs, and thefts.

I ask Mr. Hanrez what would happen if, after waiting four days, the quantity of goods to be sent is under 800 kgr.

Mr. Hanrez. (In French.) — In this case the wagon would be despatched be-

cause the railway administration is obliged to do so by the legal time limit.

Mr. Kirkness. Madras and Southern Mahratta Railway. — You would then have to despatch a very small load.

Mr. Hanrez. (In French.) — Because one would be obliged to do so.

Before the war, all goods handed in to be loaded in « incomplete » loads might be sent away under tariff II within the space of two days, or under tariff III within the space of four days. Stations were even allowed to load in the same wagon goods under tariff II and goods under tariff III, but the public found that goods sent under tariff III arrived at the same time as those sent away under tariff II, and consigned no more goods under tariff II. (*Discussion.*)

The President. (In French.) — I must ask you, Gentlemen, not to all speak at once, it is impossible to understand a thing.

Mr. Lamalle. (In French.) — Here is the text which I propose : « The minimum load for a single wagon, fixed by the administrations, with a view to making sufficiently good use of rolling stock, and at the same time meeting the public demand for rapid transport, varies from 1 1/2 to 3 tons (1 500 to 3 000 kgr.); in England it is as low as 1 ton (1 000 kgr.). »

Mr. Henry-Gréard. (In French.) — A text of this description appears to be inadvisable, the wise course would be to delete entirely this paragraph.

Mr. Lamalle. (In French.) — I do not think I can support Mr. Henry-Gréard's suggestion, because all the administrations are interested in the minimum to be adopted for a complete wagon load.

It is therefore necessary to retain this paragraph.

The President. (In French.) I put to the meeting the text which Mr. Lamalle has just proposed in the last place.

— Adopted.

The President. (In French.) — We will now pass to the last portion of paragraph 8.

« The forwarding of wagons on given days only ensures a more efficient use of rolling stock, but necessitates large warehouses and greater care in regard to thefts. »

Mr. Bonnevay, principal secretary. (In French.) — Mr. Watson proposes the following text : « When justified by traffic conditions and when the demands of the daily service make it necessary, the acceptances, etc... »

Mr. Moutier. (In French.) — I have to say that no account has been taken in this paragraph of a system which is at the present time used on the Northern Railway of France and which has given excellent results.

In all that has been said on this question in which one has tried to find a satisfactory compromise between the efficient utilisation of rolling stock and rapidity of transport, there is a method which has not been mentioned, but which exerts a strong influence over the whole of the French system and the regularity with which goods are despatched.

One may take as an example the system that is in operation on the Northern Railway.

In dealing with goods in small consignments for slow freight traffic, the smallest parcel is despatched on whatever day it is handed in in a particular wagon in a predetermined goods train, almost with a

certainty of arriving at a destination after a definite time X which varies with the destination, but which is always the same in the case of goods sent from the same station to the same destination.

The particular wagon in question, known as a pick-up wagon, is loaded successively at each station along the route, and finally arrives at the end of its journey fairly fully loaded. It passes junctions where it remains 10 to 24 hours with a large number of wagons from other starting points and destinations, between which the necessary transshipments are carried out.

These pick-up wagons may be looked upon as moving warehouses which start out each day from one end of the system to the other, and *vice versa*, traversing the system by the various routes in order to realise the following objects : a parcel should, whatever the day, be loaded by the despatching station into a wagon which should take it directly to its destination, or else into a wagon which should allow it to be despatched with only one transshipment in the course of its journey.

On the main lines where there are of course a large number of wagons, they are run as special trains, known as « trains de détail », the train carrying special staff for the sorting and handling of parcels.

The system once established works with the greatest regularity.

I therefore propose to say : « The daily despatch of goods at fixed hours in pick-up wagons leads to, etc. ».

Mr. Kirkness. — The system in force on the Northern Railway of France is different from that in use in England.

Mr. Nitesco. (In French.) — I would say : « Where the traffic does not justify the use of fully loaded wagons, it is ad-

visable to despatch goods on certain days. »

Mr. Moutier. (In French.) — There is, however, a difference between despatching goods on certain days and in doing so every day.

Mr. Ehrenfreund. (In French.) — I agree with Mr. Moutier. As a general rule the same applies to Italy. However, the final summary of the Congress must deal with the particular arrangements in force on the different railways.

The text says : « Despatching goods on certain days leads to a better utilisation of rolling stock, etc. »

There is in force on some railways another system which avoids certain inconveniences. It is not only a matter of despatching goods on definite days which should be considered, but also their acceptance from the public. The system which we have tried as regards this matter has worked very satisfactorily.

In large towns where there is a large amount of goods to despatch, the public knows on which day we will accept goods consigned to destination A, and on what other day for destination B. In this way we avoid any trouble as regards warehousing and pilfering.

Is this method also in use in England and America ?

Sir Herbert A. Walker. — In England three systems are in practice for forwarding goods in small quantities.

First system : Special wagons are run for the purpose of picking up goods in small consignments.

Second system : The goods are sent to the station where they are kept during one day to be amalgamated with other goods for the same destination. In this connection arrangements with important traders are come to. For instance,

a firm in the ordinary way sends large quantities of goods from London to Liverpool. Instead of sending goods every day an arrangement is made with the trader to only forward on Mondays, Wednesdays and Fridays.

Third system : There are always daily wagons for goods in small quantities.

Mr. Lamalle. (In French.) — When I read my resume at a preceding meeting, it was said that my final summary was too long. I have therefore shortened it, and now it seems that we are lengthening it again.

The question is as follows : « Organization of slow-freight traffic, in order to increase the effective operation of the rolling stock and the lines. »

In proposing the text with which we are dealing at this moment, my whole object has been to draw the attention of delegates to the English system, which has for its special object ensuring the best utilisation of rolling stock.

As regards the organization for small consignments, this is a subject to which all railway administrations give a great deal of thought.

In Belgium, the regulations on this point are drawn up with great care. Those who have read my report will have noticed the diagram showing how consignments handed in to the railway on one evening are delivered at the other end of the country on the following evening.

I do not think, however, we can examine at length all the systems in use on the different railways, as that would take too long.

There is also a phrase which has led to confusion, namely : « necessitates large warehouses and greater care to guard against pilferage ». If it was decided to replace the word « despatch » by « acceptance », this paragraph might be delet-

ed, and one might say : « Whenever traffic conditions warrant it, the acceptance of goods on particular days is beneficial to the efficient utilisation of rolling stock. »

Mr. Pretorian. (In French.) — Mr. Lamalle has expressed my ideas in a very clear way, and I agree with his opinion.

Mr. Schiavon. (In Italian.) — The acceptance of goods on a certain day cannot become the general rule, it can only be as an expedient or a special arrangement. When is it to be used ? It should be used when the warehouses and station accommodation are insufficient. It is for this reason that while I agree with the amendment proposed by Mr. Lamalle, I would suggest a modification which not only takes into account the increase in volume and quantity of traffic, but which also takes into account the question of lack of accommodation.

I would therefore propose to say : « where accommodation is insufficient for the quantity and volume of traffic, the acceptance of goods on definite days, in accordance with their destinations, is to be recommended. »

Mr. Payet. (In French.) — I propose that we adopt the latter text presented by Mr. Lamalle, which is also in agreement with the remarks that I made when I got up to speak, and which sought to replace the words : « despatch on a certain day » by « acceptance on a certain day ».

We have had the experience of the system in practice on the French State Railways during the latter part of the war, and we have obtained excellent results by making suitable arrangements with the public. Since the war, we have continued the same system at a certain number of stations. It should be added, however, that at certain places some tra-

ders have been unwilling to fall in with this arrangement.

We have also collecting and despatching wagons, and especially in the case of the larger stations the grouping of goods consigned to the same district has given excellent results, thus we not only despatch goods on certain days for certain stations, but also for certain districts. We have in this way obtained a better utilisation of rolling stock, because we have avoided a large number of reloadings.

Mr. Fiala, Czecho-Slovakian State Railway. (In French.) — In my country the railway administration has come to an agreement with the smelters in order to deal with their traffic at certain periods; coal and other heavy goods are carried in the Summer, so that the beetroot traffic may be handled without difficulty in October.

Mr. Pretorian. (In French.) — One should make a distinction between the acceptance of goods at the stations on definite days and the acceptance of goods to be despatched on definite days. In the second case there is no need for large warehouses or for greater vigilance to be exercised to avoid pilferage.

In any case, I support the text proposed in the latter place by Mr. Lamalle.

Mr. Hanrez. (In French.) — I propose to replace the word « acceptance » by the word « despatch ».

The President. (In French.) — I put to the vote the amendment as just proposed by Mr. Lamalle. It reads as follows : « Whenever traffic conditions warrant it, the acceptance of goods on particular days is beneficial to the efficient utilisation of rolling stock ».

— Adopted.

The President. (In French.) — We now pass to paragraph No. 9.

9. « Rapidity in shunting is dependent upon the use of powerful locomotives which have a reserve of power and are worked by men with special knowledge and well-trained.

« More and more advantage is being taken of gravity, either by means of sidings on a slope or by « humping ».

« The allocation of bonuses to the men employed in shunting is of advantage in getting the best out-put from marshalling yards and, consequently, a better turn-over from stock. »

Mr. Ehrenfreund. (In French.) — Although we probably all agree on this paragraph, I would like to know if we are equally in agreement as regards the words « is dependent on the use of powerful locomotives. »

In my report I have always spoken of locomotives suitable for shunting work, because there are cases in which we have no need of powerful engines.

Does Mr. Lamalle wish to retain the words « powerful locomotives » ?

Mr. Lamalle. (In French.) — I have taken these words from another report and I have used them in the text because I find it advisable to provide stations with powerful éngines so that shunting could be carried out rapidly.

Mr. Moutier. (In French.) — I would add a few words in support of what Mr. Lamalle has just said.

I quite appreciate the allusion he has made to a change which should be made in railway practice. Formerly the oldest engines were thought good enough for shunting work, and there was a tendency to only use these, whereas today, when greater importance is attached to the output of sorting and marshalling sidings

and for all shunting in general, it is generally considered necessary to have powerful shunting engines specially designed for this work. This is not, however, a reason for going to the other extreme.

Mr. Lamalle. (In French.) — One might delete the word « powerful », the expression « having ample power » will cover the point.

Mr. Ehrenfreund. (In French.) — I must thank Mr. Moutier for supporting my point of view.

A large number of railway companies have the very bad practice of using for shunting work old engines which are no longer fit for main line work.

One should use powerful engines specially designed for shunting work.

Mr. Vigna. (In Italian.) — The need for having suitable engines for shunting is evident.

Those who have had any experience in shunting work know for example that engines fitted with a power brake can be quickly stopped and restarted in the opposite direction. It is quite right to say « powerful engines », but I would add the words « and suitable ».

Mr. Maison. (In French.) — We should retain the recommendation to build powerful engines for shunting work, but it should also be said that the engines must be suitable for this service.

Much trouble is experienced in France due in many cases to the fact that shunting engines are not sufficiently powerful.

It would perhaps be preferable to retain the word « powerful » and say « suitable for shunting work ». (Agreed.)

Mr. Henry-Gréard. (In French.) — There should be some connection between the type of locomotive and the work it has to do.

Mr. Lamalle. (In French.) — The words « having ample power » express this idea quite well. There must be a reserve for cases where there is snow, etc. It is also necessary that the engine can stop and start quickly.

Mr. Maison. (In French.) — I quite agree with Mr. Lamalle, but if I also ask that the engine should be suitable for shunting work, it is because it appears to me to be necessary that it should be well designed so as to meet the requirements of this service. This is why I would like to see added the words « specially suitable for shunting work ».

Mr. Ehrenfreund. (In French.) — I agree.

Mr. Lamalle. (In French.) — The text might be worded as follows :

« Rapidity of shunting is dependent on the use of powerful locomotives of suitable types which are well up to the work. »

— Adopted.

« They should be handled by men accustomed to this special duty. »

— Adopted.

« The use of gravity shunting is ever increasing, either by placing the sidings on an incline, or by using a hump. »

— Adopted.

« The payment of a bonus to shunters has the effect of increasing the output of the sorting sidings, and consequently of the rolling stock. »

— Adopted.

10. « In order to encourage the public to use stock in a more intensive manner, variable tonnage rates have been fixed

according to whether the full tonnage capacity of the vehicle is used or not.

“ For the same reason, special reduced rates are charged when the consignment is equal to the capacity of several wagons or to a whole train load. »

Mr. Maison. (In French.) — Should we not mention here the method in use on the Italian State Railways, which consists of taking a deposit from the public when they ask for rolling stock?

Wasteful demands for wagons and the corresponding inefficient use of rolling stock has thus become a thing of the past.

It would perhaps be sufficient to complete the last part of the paragraph by the following words : « Great care should be always exercised in meeting demands for wagons ».

Mr. Nitesco. (In French.) — I hardly think that is necessary.

Mr. Maison. (In French.) — Please note I have not made a formal proposition. I have found this idea expressed in Mr. Ehrenfreund's report, and I thought it advisable to draw the attention of the section to it.

Mr. Lamalle. (In French.) — I support Mr. Maison's proposition. I have, however, drawn up another wording : « The practice on the Italian railways, who demand a deposit, is to be recommended. »

If I mention the Italian railways, it is so that those who are interested in the question should know where they can obtain the necessary information in the future.

Mr. Luuyt. (In French.) — I prefer Mr. Maison's proposal which indicates in a simple way the fact that this system is in use. I should not like to say that the system is to be recommended. We have

tried it on the Algerian Railways of Paris-Lyons-Mediterranean Company, and it has given rise to great inconvenience.

Mr. Ehrenfreund. (In French.) — Can the English and American delegates give us any information on this delicate question?

Mr. Kirkness. — The system of deposits does not exist in England.

Mr. Ehrenfreund. (In French.) — Allow me to ask another question.

What does a railway do in the case where the public ask for wagons and do not load the same in the stipulated time? Does it keep its rolling stock empty? In Italy the deposit money is retained by the railway.

It is necessary to have some guarantee, and that is why I support Mr. Lamalle's text, which says that a system of deposit is to be recommended.

Mr. Maison. (In French.) — I think it might be well to ask for the remarks of the different administrations on this question.

In the proposition which I have had the honour to lay before you, I have simply stated a matter of fact. Is there any necessity to go further? I do not think so. I would ask if the question is sufficiently ripe for any decision to be come to as regards the future. It is necessary to proceed carefully, especially after the experience of the Algerian Railway which Mr. Luuyt has just mentioned.

Mr. Vigna. (In Italian.) — The method of demanding deposits from the public when they ask for rolling stock is not solely in order to avoid abuses, but is in accordance with the actual cost incurred by the railway. As a rule we do not demand this payment at stations where there are always wagons available for

loading up goods, but we demand it at the wayside stations, where, when a wagon is asked for, it is often necessary to bring an empty wagon from another station. The charge is justified in cases where the wagon is not loaded, because it corresponds to the expense incurred by the railway in sending the wagon.

Mr. Lamalle. (In French.) — It is sufficient to keep this point in view. I therefore propose to add : « Care should always be taken to avoid unnecessary demands for rolling stock on the part of the public ».

— Adopted.

The President. (In French.) — I now put to the vote paragraph 9 (formerly No. 10) with this addition.

— Adopted.

11. « In order to speed up the unloading of wagons, advice notes are sent out by the most rapid means, and a large number of administrations inform the consignees by telephone.

« With the same object, demurrage charges are imposed for wagons which are not unloaded within the prescribed time and these charges are calculated in different ways. Some railways do not confine themselves to penalties for time only, but they also take into consideration the weight of the goods to be unloaded.

« The same result is attainable also by granting diminutions of taxes to the traders who unload the wagons in less than the prescribed time. »

Sir Herbert A. Walker. — In England the system of deposits is not practised, but demurrage charges are made on wagons not loaded or not unloaded in the stipulated time. This also seems to exist in France and the idea would be met

by placing the words « not loaded or... » before the words « not unloaded » in paragraph 2.

Mr. Nitesco. (In French.) — I propose to say in the last part of the paragraph « one may also obtain results » in place of « one can obtain the same result ».

The President. (In French.) — The first part not having called for any remarks may be considered as being adopted. (*Agreed.*)

I now put to the vote the second part of Sir Herbert A. Walker's amendment.

— This paragraph was also adopted.

Mr. Ehrenfreund. (In French.) — I should like to ask for an explanation on the third part of the paragraph.

In what countries are reductions in rates allowed to railway users who unload their wagons in a space of time less than the statutory time?

Mr. Maison. (In French.) — This is done in France.

Mr. Moutier. (In French.) — The system of reduced rates for users who unload wagons in a very short time was formerly in successful use on the Northern Railway of France. At the present time it is not employed in view of the unification of rates, the practice having been cancelled by an adverse majority in the Railway Committee. It would, however, be a good thing to see it revived.

I therefore ask that this portion of the paragraph be maintained.

Mr. Ehrenfreund. (In French.) — According to what I have just heard, the system of reduced rates is no longer in use either in England or in Italy.

Thus the text merely expresses a wish.

Mr. Moutier. (In French.) — One might

say « Good results have been obtained, etc. » (*Agreed.*)

Mr. Crimail. (In French.) — This shows no hostility to the practice.

The President. (In French.) — The last part of the paragraph would therefore read as follows :

« Good results have been obtained by charging reduced rates to traders who unload their wagons in a shorter time than that allowed by regulation. »

— Adopted.

Mr. Ehrenfreund. (In French.) — I would like to ask another question.

Mr. Lamalle will remember that I spoke at length in my report on the special organisation that we have in Italy for trains dealing with goods in small consignments.

The following is what I said upon this subject :

« In certain cases — to avoid an excess of appliances and staff at stations — it may be useful for pick-up trains to carry gangs of porters to assist the station staffs in loading, unloading, and for assembling goods to be sent on farther than the distance travelled by the train, by transshipping them during the stops at intermediate stations. »

I should say that in my country views are somewhat divided on this point and that some officials object to this organization because they say it does not produce any appreciable results, especially in the North where in times of snow the work becomes difficult. They prefer the method of sending these trains to large stations which have the necessary accommodation for this purpose.

The two systems are in use in my country. I notice that on the French Paris-

Lyons-Mediterranean they adopted almost the same system for parcels traffic by means of intercommunicating wagons, while in my country the parcel service is carried out on all the trains.

I would like to know if this system is used or has been experimented with in other countries.

Sir Herbert A. Walker. — In England almost the same system functions. With all « passenger trains » there are guards charged with the handling of what we call « Parcels Traffic » which is equivalent to « Marchandise par Grande Vitesse » in France. It is the same thing in India where this organization has given excellent results.

Mr. Moutier. (In French.) — I would repeat that on the Northern Railway of France these trains are accompanied by a staff for carrying out these duties in addition to the ordinary train crew.

Mr. Nitesco. (In French.) — In Roumania there is also this additional staff.

Mr. Lamalle. (In French.) — Mr. Ehrenfreund's remarks have reminded me that in my general final summary I have drawn attention to this matter in the following terms :

« It is interesting to note the practice of the Italian railways who send gangs of men on their pick-up trains to help the station staff in the handling of the merchandise, etc. »

In Belgium, these trains are accompanied by reloaders, whose special duties are to carry out the handling and sorting of parcels in the wagons. These men do not assist the station staff in transporting the parcels between the warehouses and the wagons. The Italian system appears to me to be excellent, but in accordance with the stress that is laid on the neces-

sity of shortening the final summary, I have cut out the details.

The President. (In French.) — This terminates the discussion of question XI. Before we commence the discussion of question XII, I have to thank Mr. Bonnevay, principal secretary, for the services he has rendered us in the course of our work. (*Applause.*)

Mr. Bonnevay, who is called to sit in

the 4th section, will be replaced here in his capacity of secretary, by Mr. Epinay, assistant chief of the Traffic Department of the Orleans Railway Company.

Mr. Nitesco. (In French.) — Before we separate, I have, in the name of all the members of the section, to thank the president for the admirable way he has presided over our discussion. (*Applause.*)

DISCUSSION AT THE GENERAL MEETING

Meeting held on 27 April 1922 (afternoon).

Mr. R. DE CORNÉ, HONORARY VICE-PRESIDENT, IN THE CHAIR.

GENERAL SECRETARIES : Mr. J. VERDEYEN ; Mr. E. FRANZA ; Sir HENRY FOWLER.

ASSISTANT GENERAL SECRETARY : Mr. N. GIOVENE.

Sir Henry Fowler, general secretary, read the

Report of the 3rd section.

(See *Daily Journal of the session*, No. 4-5, p. 7.)

« Mr. LAMALLE (*special reporter*) gave a brief resume of the five reports which had been prepared on this question. He drew attention to the difficulty in drawing up a summary on the whole of the reports, in consequence of the differences between American practice and that of the Continent of Europe or Great Britain. The deductions of his general report gave the meeting a true statement of facts, but at the same time in a rather extensive form. Mr. Lamalle would draw up a more concise resume to be presented to the section at a forthcoming meeting.

« Mr. BRISSE (*French Eastern*) stated that

in his opinion that part of the general report which dealt with the capacity and tonnage of wagons is outside the scope of the present investigation, which should only deal with the organization of transport in order to obtain a more efficient use of existing rolling stock, whatever this might be.

« The REPORTER replied that the organization of transport with a view to increasing the carrying capacity of the railways depends upon the rolling stock employed, and for this reason it would appear of interest to draw attention to present day tendencies.

« Mr. MAISON (*French Government*) and Mr. NITESCO (*Roumanian State*) agreed with Mr. Lamalle on this point.

« The tendency to increase the tonnage and capacity of wagons, mentioned by the special reporter, is not a matter of contro-

versy, as far as the past is concerned, but the majority of the assembly is of the opinion that a satisfactory compromise has been arrived at.

« Mr. EHRENFREUND (*reporter*) drew attention to the fact that the various reports mention difficulties experienced with rolling stock having too high a tonnage.

« Mr. CRIMAIL (*Chinese Government*) considered that it is necessary to emphasise the fact that a considerable and continual increase in the size of rolling stock is not desirable.

« Mr. PAYET (*French State*) remarked that the maximum tonnage depends in the first place on the nature of the preponderant traffic. Industrial custom should not determine the choice of rolling stock, but these customs should be changed whenever they are prejudicial to economical transport. He quoted an example in which the French State Railway had been successful in reconciling the public to a change in methods, which had been very advantageous.

« Mr. TATLOW (*Midland Railway*) stated that a special committee appointed in England to select the type of rolling stock to be built in the future has in the end selected a wagon of 12 tons only, although the bulk of the traffic consists of coal.

« Sir Evelyn CECIL (*London & South Western Railway*) pointed out that this only refers to rolling stock for general use, and that the use of high capacity wagons is not excluded.

« After the discussion had been continued by Messrs. MAISON, WATSON (*London & North Western Railway*), BALDWIN (*Illinois Central Railroad*) and MOUTIER (*French Northern*), it was agreed simply to mention the increase in the capacity of wagons and to mention that the nature of the traffic is a determining factor.

« As regards the subject of the common use of rolling stock by various companies in the same country, it appeared from the discussion, that the reporter has had in view, not merely the running of one company's wagons over another system to avoid transshipment, but the general use of these wagons, so that as regards their use they form a common stock.

« Mr. TATLOW explained that in England, before the war, there had been a simple exchange of rolling stock, with a record kept of the destination of wagons, but now the practice is to make common use of wagons. This system is considered advisable.

« Mr. MORSE (*Pennsylvania System*) stated that wagon sheets are not used in America, and in consequence a modification was made in the text, and was agreed to.

« Mr. NITESCO asked if certain companies run trains solely for picking up or detaching at wayside stations.

« Mr. MOUTIER cited the case of the French Northern on which trains run as « pick-up » trains over a certain part of their journey, and then as « through trains », or inversely, in the case of detaching trains.

« On the proposal of Mr. PRETORIAN (*Roumanian State*), mention was made of trains picking up or detaching wagons en route.

« While mentioning the increase in the number of wagons forming a train, the section were opposed to giving any definite figures on this subject.

« Mr. WATSON said that in England this may be as much as 120 empty wagons or 80 loaded.

« Following a remark by Mr. VIGNA (*Ita-*

lian State), the discussion, in which Messrs. MAISON, LUUYT (*Paris-Lyons-Mediterranean*), WATSON and SCHIAVON (*Italian State*) took part, turned on to the question of banking engines and double heading. The REPORTER stated that he wished to draw attention to two different cases, that in which double heading is used on lines with long and steep inclines or in very undulating country, and that in which a banking engine is used on short inclines, being additional in some cases to double heading.

« Mr. SCHIAVON asked that mention should be made of the need of maintaining the load constant and at its maximum, which was the justification of these practices.

« As regards the subject of the most economical speed of trains, from a commercial point of view, Mr. WATSON proposed a new text, which was agreed to by the reporter and adopted.

« The attention of the assembly was then directed mainly to the question of the transport of goods in small quantities.

« Mr. EPINAY (*Paris-Orleans*) remarked that if it is true that rapidity of transport ought not to be obtained to the detriment of the efficient use of rolling stock, unfortunately the time limits which are usually imposed upon the railways do not always allow this principle to be adhered to.

« The REPORTER replied that it goes without saying that the regulation time limits must be observed, and therefore it is desirable that these times should not be too short.

« The question of complete wagon loads for goods in small quantities was then discussed.

« Mr. LONEY (*Midland Railway*) stated

that in England a load of 1 ton (1 000 kgr.) was considered sufficient for a wagon to be sent direct.

« Mr. EHRENFREUND drew attention to the fact that it might be inadvisable to discuss this question before the general public, on whom fairly high minimum tonnage conditions are as a rule imposed, and who might be astonished to find in the text that the railway administrations consider a load of 1 1/2 tons (1 500 kgr.) sufficient to warrant the use of a separate wagon.

« Mr. HENRY-GRÉARD (*Paris-Orleans*) was of the same opinion, and asked that no mention should be made of the minimum load.

« After various observations by Messrs. PRETORIAN, CRIMAIL, Sir Herbert A. WALKER, Messrs. HANREZ, VIGNA and MAISON, a new text was drawn up by the reporter and adopted.

« The acceptance of goods in small quantities on particular days, according to their destinations, was considered very satisfactory as regards the efficient utilisation of rolling stock, but it necessitates a previous arrangement with the traders, for this method could not be enforced upon them.

« In reply to a question by Mr. EHRENFREUND, Sir Herbert A. WALKER stated that this is common practice in England.

« Mr. PAYET also was strongly in favour of this method, which has in some cases been successfully introduced on the French State Railway.

« Mr. SCHIAVON thought that this could scarcely be justified except where the railway accommodation was insufficient to store in warehouses the goods that are not forwarded on the same day as they are received.

« An analogous case was cited by Mr. FIALA (*Czecho-Slovakian State*), who informed the section that the Czecho-Slovakian Railways have made an arrangement with the refiners so as to distribute the traffic over certain periods; the transport of coal and limestone is carried out in the Summer, so that the beet crop can be handled without difficulty at the time of the harvest in October.

« Messrs. EHRENFREUND, MAISON and VIGNA, speaking on the subject of shunting engines, insisted on the necessity of using not only powerful locomotives, but also of types suitable for shunting.

« As regards the question of the influence of rates on the utilisation of rolling stock, it is stated that in Italy a deposit is as a rule required from the public when they requisition rolling stock.

« Mr. VIGNA explained that this was only done in order to prevent abuses on the part of the public, but very often in practice it corresponds to the actual loss incurred by the railway.

« Sir Herbert A. WALKER stated that in England demurrage is charged for wagons which are not loaded in a stipulated time, just as in the case of wagons the unloading of which is delayed.

« Mr. MOUTIER stated that formerly they had successfully adopted on the Northern Railway a system under which reduced rates were charged to traders who unloaded their wagons with the least delay. »

The President. — This is the

Final summary.

« 1° Within the limits allowed by traffic conditions and by the maximum permissible axle load, there is a gen-

eral tendency to increase the tonnage and capacity of wagons. In Europe preference is given for a tonnage of 12 to 20 t., and in special cases, for certain heavy goods, of higher capacities of 40 to 50 t. In America this tonnage is always exceeded, and is sometimes as great as 100 short tons;

« 2° In order to reduce empty wagon mileage, the administrations attempt as far as possible to limit the number of types of wagons.

« For the same reason, on the continent the railways leave the construction of wagons for special purpose to private enterprise.

« In cases where there are several companies working the lines in the same country, the « common user » utilisation of stock has a beneficial effect in reducing the empty wagon mileage;

« 3° There is tendency among European railways to construct more open wagons, the contents being protected by sheets.

« A number of railways facilitate the sheeting of wagons by providing movable supporting bars;

« 4° The question of whether trains should run as through trains or should pick up or detach wagons en route must depend on the volume and nature of the traffic;

« 5° There is evidence of a tendency to increase the number of vehicles in the make up of freight trains.

« In order to avoid the necessity of reducing the load below the normal, the use of banking engines on steep gradients is common practice, and two or three engines are used to work trains over lines with long and heavy gradients or through undulating country.

« Heavy trains run for the most part at slow speeds; light trains run at high speeds are the exception;

“ 6° It is desirable that transport
“ should be as rapid as possible, provided
“ trains are loaded to their maximum ton-
“ nage.

“ The working time-table should be ar-
“ ranged so as to take full advantage of
“ the carrying capacity of the lines;

“ 7° In dealing with goods in small
“ quantities, rapidity of transport should
“ not be obtained to the detriment of the
“ economical use of rolling stock.

“ It is to be understood that the legal
“ time limits must be observed.

“ The minimum load for a single wa-
“ gon, fixed by the administrations, with
“ a view to making sufficiently good use
“ of rolling stock, and at the same time
“ meeting the public demand for rapid
“ transport, varies from 1 1/2 to 3 tons
“ (1 500 to 3 000 kgr.); in England it is
“ as low as 1 ton (1 000 kgr.).

“ Whenever traffic conditions warrant
“ it, the acceptance of goods on particular
“ days is beneficial to the efficient utili-
“ sation of rolling stock;

“ 8° Rapidity of shunting is dependent
“ on the use of powerful locomotives of
“ suitable types which are well up to the
“ work.

“ They should be handled by men ac-
“ customed to this special duty.

“ The use of gravity shunting is ever
“ increasing, either by placing the sid-
“ ings on an incline, or by using a
“ hump”.

“ The payment of a bonus to shunters
“ has the effect of increasing the output

“ of the sorting sidings, and consequently
“ of the rolling stock;

“ 9° In order to induce the public to
“ make full use of rolling stock, different
“ rates are charged according to whether
“ the load is equal to or only part of the
“ full capacity of a wagon.

“ For the same reason, special reduced
“ rates are charged when the consign-
“ ment is equal to the capacity of several
“ wagons or to a whole train load;

“ Care should always be taken to avoid
“ unnecessary demands for rolling stock
“ on the part of the public.

“ 10° In order to speed up the unloading
“ of wagons, advice notes are sent out
“ by the most rapid means, and a large
“ number of administrations inform the
“ consignees by telephone.

“ For the same reason, wagons which
“ are not loaded or unloaded within sti-
“ pulated times are charged demurrage
“ fees, which are fixed on different bases.
“ In this respect some administrations
“ not only take into account the length of
“ the delay, but make the charges depen-
“ dent on the weight of the goods to be
“ unloaded. Where the demurrage fees
“ are based on the length of the delay,
“ they are directly proportional to the
“ same, or else increase progressively.

“ Good results have been obtained by
“ charging reduced rates to traders who
“ unload their wagons in a shorter time
“ than that allowed by regulation. »

— The general meeting ratified this
summary.

LOCOMOTIVE CAB SIGNALS

Repeating and recording the track signals on the locomotive. Different systems already used or tried. Results obtained.

Recording the running speed of locomotives.

Preliminary documents.

1st report (France), by Mr. F. MAISON. (See English edition of the *Bulletin* of November 1921, p. 1709, or separate issue [with red cover] No. 39.)

2nd report (France), by Mr. J. VERDEYEN. (See English edition of the *Bulletin* of March 1922, p. 537, or separate issue [with red cover] No. 63.)

3rd report (all countries, except France), by Mr. F. VILLA. (See English edition of the *Bulletin* of May-June 1922, p. 821, or separate issue [with red cover] No. 65.)

Special reporter : Mr. J. VERDEYEN. (See English edition of the *Bulletin* of April 1922, p. 738.)

SECTIONAL DISCUSSION

Meeting held on 26 April 1922 (morning).

Sir EVELYN CECIL, VICE-PRESIDENT, IN THE CHAIR.

The President. (In French.) — Before calling upon Mr. Maison it will be well, in view of the discussion, to make some corrections in the proposed summary given on page 19 of No. 6 of the *Daily Journal*.

Under 1°, the phrase : « *is a necessity at the present day* » must be replaced by « *is advisable* ». Moreover, at the end, the words should be added : « *on double tracks and on single tracks* ».

Under 2°, for « *in no case can it* », read : « *under present conditions it cannot* ».

Under 3°, delete the words : « *and with this object it is necessary to reproduce it on the strip of the speed-recording indicator. Warning should only be given to the driver for signals standing at danger* ».

Under 5°, for the words « *does not commend itself* », read : « *cannot be accepted* ».

I will now call upon Mr. Maison to speak.

Mr. Maison, Ministry of Public Works, France, reporter. (In French.) — Gentlemen, question XII is worded thus : « Repeating and recording the track signals on the locomotive. Different systems already used or tried. Results obtained. Recording the running speed of locomotives. »

This is a two-fold question. It refers actually to two very different ideas : « *The repeating and the recording of signals in the driver's cab* » and « *the recording of the running speed on the locomotives* ». It will be well, for the sake of clearness in the discussion, to treat these two points separately.

The question of repeating the track signals on the locomotives has met with great prejudice for a large number of years.

In France, in particular, it appeared likely never to come into general use and even to be discarded completely. It was alleged that it was of such nature as to dull the attention of the driver.

Nevertheless this problem has in some way been forced upon the railway world as the result of various accidents and enquiries, in the course of which it has been found that, if the observation of the signals by the driver is the main factor in securing safety, it is not right to confine the recommendation to deplored accidents which have occurred and to do nothing to assist the driver in his work — work which becomes more and more difficult as the tonnage and the speed of the trains are increased.

It has appeared, on the other hand, that whereas, formerly, when the driver did not see a signal at danger, it might be plainly stated that he had been guilty of inattention; at the present time cases might occur where the question of attention was not the only one to be

considered, for it might happen that the driver had to take his eyes off the road at a given moment : and it was well to take account of this possibility.

In any case, the adoption of apparatus of this class might give rise to the criticism that the driver would be led to trust to the presence of such apparatus and so diminish his vigilance and it was thought that it was necessary to supplement an appliance of this kind by a method of checking it, in order that what was gained in one way should not be lost in another.

This is how the question has been put in France and in other countries.

I do not think it necessary to go into this subject in greater detail, because all the delegates have had an opportunity of reading the three reports on the question.

I will confine myself to mentioning three special points which appear more particularly to require attention.

The first relates to the recording of signals at line clear. In general terms, it has appeared necessary to record the passing of signals at danger, which should be accompanied, moreover, by the working of an audible or visual signal. But the working of the apparatus at signals standing at line clear has not met with the unanimous approval of the railway Administrations. I think, however, that there may be a reason for recording these signals in order to obtain thus a permanent record of the proper working of the appliances arranged on the track, at the same time as of those carried on the locomotive. It appears, however, that this check can be obtained by other means.

Here a quite special point comes into consideration. Passing signals standing at danger should result in a record and in the working of the audible signal. But we think that the working of an audible signal on passing all signals at line clear

would be disadvantageous. Actually, when the driver runs over a rather long section of a main line where the number of signals is large, the ultimate effect on the ear of the driver, will be to accustom him to it; if the apparatus should work at every signal on a main line, he may meet 100, 150 or 200 signals, and if on passing each of them he hears the warning, it is to be feared that he will not notice the warning given for a signal standing at danger. This difficulty could be overcome by using different audible signals for the working of the apparatus at signals standing at danger and at those standing at line clear. At signals standing at line clear the audible warning might be very faint, but still loud enough to enable the driver to check it though not so loud that he could mistake it for the warning of a signal at danger.

It is in accordance with this generally accepted view that the three reporters have drawn up their summary.

The recording of the passing of signals makes it possible to check the work done by the drivers; it even enables check to be kept very easily on what may be called the vigilance of the driver, by compelling him, at the time when he approaches a signal at danger, and as soon as he has seen that the signal is at danger, to take an action recording that he has seen the signal, an action which can be recorded in such manner as to show whether it was taken before or after the locomotive passed the warning signal: if the record of the action precedes that of passing the warning apparatus the driver has shown vigilance; if not, the driver has been taken by surprise by the signal.

The second point to which I would draw attention deals with the automatic stopping of the train by the apparatus that repeats the signals.

A few years ago it was generally thought

in France that these appliances should not automatically stop the train. This opinion was so definite that any apparatus that worked automatically was not thought worthy of consideration. It was admitted that the working of the warning was necessary to help the vigilance of the driver, but that the apparatus might give rise to more disadvantages than advantages from the point of view of safety, if it acted on the brakes in such manner as to cause the automatic stopping of the train.

In my report I have set out the opinions expressed on this subject by the railway companies and by the French Administration.

I should state, that since the war, a certain change of general opinion has taken place in France on the subject of this question; the French Administration which had to investigate the various inventions has no longer refused to consider those appliances which cause the automatic stopping of the train. Each of us may think that such appliances are liable to give rise to serious disadvantages of such nature as to put them out of the question, but they must not be set aside without receiving consideration.

However this may be I continue to believe that the general opinion in the French railway world rather leans towards the idea that the automatic stopping of the train may be dangerous and is not to be recommended. This is also the opinion of the two other Reporters.

We have, therefore, proposed a summary suggesting the setting aside of appliances that cause automatic stopping.

Moreover, apart from the disadvantages which may arise, it is necessary to note that the stoppage of a train is not a question of automatic action, but that it is rather a question of personal skill. A train running at 120 km. (75 miles) per hour cannot be stopped under the same

conditions as a train running at 60 km. (37.5 miles) per hour. The automatic stopping of the train cannot make any distinction between different cases.

It is now generally thought that it is necessary to give a warning to the driver in case the necessities of his work may have occupied his attention to such an extent that he has passed a signal without seeing it, but that once the warning has been given, it is not suggested that a driver after being properly warned should not bring his train to a stop himself.

The third question relates to the fitting of a visual signal in the driver's cab.

I stated just now that it was generally accepted that the warning ought to be given by an audible signal. Some Administrations have thought that this might be supplemented by a visual apparatus arranged in the driver's cab.

The Congress will come to a conclusion on the point as to whether it is advisable to recommend this visual signal. In my opinion, I think that the visual signal in the cab should be discarded and that the question should be limited to an audible signal.

It is to be noted, moreover, that the observation of the signals themselves will continue to be the best guarantee of safety. It is therefore necessary that the apparatus should not distract the attention of the driver for a moment, in any manner whatever, from watching the track. If an apparatus is arranged in the cab it will be obvious that the driver will be looking at it frequently instead of keeping his attention on the track.

This apparatus would, therefore, have the great disadvantage of distracting the attention of the driver from the track signals; for this reason, therefore, it is not to be recommended.

With regard to the audible signal the

same disadvantage does not present itself; it would work only seldom. The trains generally keep time, and the driver should find a clear road nearly everywhere. But if, under exceptional circumstances, for any cause, the main track has not been cleared at the time when the train enters the section, the audible warning would compel the attention of the driver to the fact that he had passed a signal at danger if he had not seen it in time.

Before concluding I should like to state the present position of the matter in France.

The question of repeating track-signals on locomotives may be considered as solved. I do not say that the appliances are perfect, but that the problem has been solved to the extent that at the present day there are many of these appliances in regular work.

In this respect, the French Northern Railway is ahead of all others; a good many years ago it installed the « crocodile » on all its double-track and single-track lines.

From the point of view of apparatus that should be adopted, it has appeared in France, that it might be advisable to standardize a single type of apparatus capable of being operated by any locomotive on any railway system. This is the electric « crocodile » system which was in use on the French Northern Railway before the war, and which has been adopted by all the railway systems. I should add that the French Midi Railway had not a few months ago made known its decision. Since then, however, it has stated that it has given up the use of detonators and adopted the « crocodile ».

It may be said that the situation is as follows : the French Northern Railway has already fitted the « crocodile » on the whole of its lines. With regard to the

other railway systems, it has been decided that they will fit « crocodiles » on all their lines. But, little by little, this decision has been made less stringent, at any rate so far as the first step is concerned. The French Administrations have proposed to accept the fitting of the « crocodiles » now on lines carrying express traffic, and as a second step they will proceed with the equipment of lines carrying light traffic, it being understood that the connexion of sidings with lines carrying fast traffic shall be effected in such manner that drivers running from the siding on to the main line shall be warned on passing the junction signals on to fast traffic lines either by a warning appliance or by an audible signal of some type or other.

The programme that I have just set out will be carried out at the latest by the 1 July 1924. At this date all the lines carrying fast traffic will be fitted with the « crocodile » and all the locomotives will be fitted with a warning appliance.

With regard to the summary that we have set forth, this has been drawn up in common agreement with Messrs. Verdeyen and Villa.

Mr. Verdeyen, special reporter. (In French.) — The following is the new summary proposed :

« 1° The repetition of signals, on the locomotives, is advisable, chiefly for fast and express trains and for the heavy freight trains on double tracks and on single tracks;

« 2° Repeating the signals must be considered solely as an adjunct to the safety measures destined to render more easy the observation of signals; under present conditions it cannot be a question of substituting this system of signals for the track signals, the direct observation of which by the driver will always remain the greatest guarantee for safety;

« 3° The repetition of signals should be organized in such a manner as not to dull the attention of the driver and, with this object, the apparatus should, at the same time as it conveys a warning to the driver of the position at danger of the signal to be met, record his passing this signal. The record should be made in such a manner that the exact position of the signals passed can be found, but it may be of advantage also to record the signals standing at line clear, distinguishing these from those at danger, and to bring their passing to the notice of the engine driver by means of an audible signal that must only be heard by that man.

« Finally it is advisable, with a view to safety, to establish a check on the vigilance of the driver by obliging him to perform a rapid act, easy to record, when he sees a signal at danger;

« 4° The repeating of signals should only be applied to stop signals capable of being met at a high speed, unless a preceding signal warns the driver;

« 5° Warning should be given to the driver by an audible signal, as far as possible distinct from the ordinary locomotive whistle, and loud enough to be heard not only by the driver, but also by the other employees on the train. Repeating the signal by the indication of a visual disk in the locomotive cab cannot be accepted; it can only be realized if it is completed by the audible signal;

« 6° It is not advisable for the apparatus to act on the brakes of the train and thus cause an automatic stop even though the driver could prevent this action taking place;

« 7° By reason of the necessity for registering the position of the signals that have been passed, it is necessary to arrange the track contacts which should

put into action the warning and recording appliances when the locomotive runs over them, actually at the signal itself or only a few feet in advance of the signal, in such manner that there may be absolute agreement between the record on the recording strip and the position of the signal seen by the driver at the moment that he was passing it;

“ 8° The repeating of signals in the cabs of locomotives may be carried out by electrically or purely mechanically driven apparatus. In France the « crocodile » type of apparatus is preferred and it is capable of application to single tracks without difficulty.

“ It can also be applied equally well to electrified tracks. »

Col. J. W. Pringle, Ministry of Transport, Great Britain. — The wording of the question lends itself to misunderstanding, because in England we employ for all these kinds of apparatus, the expression “ *automatic train control* ”.

As regards safety on the British railways, it is extraordinary, if the speed of the trains is considered, the intensity of the traffic and the frequency of fogs. British Railways may well be proud of what they have done.

Some months ago, I presided over a committee charged with examining the question of automatic train control and the accidents to trains which had happened in Great Britain during the last ten years.

This Committee found that nearly one-third of the accidents had happened because the driver had failed to observe or obey signal indications. The Committee were of opinion that about one eighth of these accidents could have been avoided by train control at the distant signal alone, about one third by control at either distant or stop signals, whilst more than one half would only have been pre-

vented by the use of control at stop signals.

I agree to the general conclusion proposed, but only for double lines. For single lines the safety provided by existing methods of working, is adequate.

Mr. Duchatel, Eastern Railway of France. (In French.) — I would like first to express the feeling my colleagues of the French railways and myself on reading, in Mr. Maisons's report, certain statements which would tend to produce the belief that the observation of the signals has become so difficult that it is necessary to repeat them on the locomotive. We read, in fact, in this report that the increase in speed of the trains, the increase in the size of the boilers, the greater amount of attention required by the locomotive, the multiplication of the signals, the increased consumption of coal and even the increased consumption of water, are of such nature as to render the observation of the signals more difficult, to render failure to observe them more easy and even to make this excusable under certain conditions.

This is a dangerous opinion, and it is still more dangerous to spread it, because we think that it is absolutely unjustified. It is true that the raising of the running speed has an indisputed effect upon the observation of the signals, but we cannot explain why the driver who drives a train to-day running at 120 km. (75 miles) per hour should find himself worse situated in this respect than was the driver of twenty, thirty or forty years ago who then ran at the same speed, and that too at a time when the continuous brake was not in existence. With regard to the increase of the dimensions of the locomotives it should be noted that in France, since it was found that this increase might interfere with the driver's view of the track, we have

shifted his position on the footplate from right to left. This is a step which has largely compensated for the disadvantages caused by the increased size of the locomotives.

This improvement of the visibility of signals and of their placing has been constantly before the French railways and has been the subject of continuous consideration. The greatest importance is attached to enabling the drivers to see the signals sufficiently far ahead for them to be picked up easily while running; precautions are even taken in certain cases to warn the drivers by distant arms which they can see some distance before reaching the stop signal.

Regarding the increasing number of signals, it has not been proved that this should produce a reduction in safety, whether the case is considered in which the drivers, on arriving at certain stations, see before them a whole forest of signals, or whether it is a question of the number of signals that they meet successively on the track. The drivers always know the road given amongst the signals which they see in running through large stations, and the greater the facilities given on the main track to the driver to keep his attention on the signals, the less risk is there that he will run past them without observing them.

Finally, I would add that for some time past the working conditions of the drivers on the French railways are such that there is no question of overwork of any kind.

In conclusion I should like to say that the important progress that has been made in France on the railways has had no adverse influence on the observation of the signals and has in no way reduced the safety of working.

This does not mean that nothing more has to be done. As long as human beings are required to observe the signals, human

failures may occur and it is natural that efforts should be made to meet this risk. But this problem, which has at no time been overlooked by us, will always be one of great difficulty, a very delicate and even a very anxious matter. Actually it does not occur only in its technical aspect; there is also the psychological side of this problem which, in our opinion, is of great importance and it is to this point that I wish to draw the attention of the Section particularly.

I have just said that the drivers are human. As human beings they have a certain reasoning power which they exercise individually or collectively. It follows that they form a certain idea about things, which may be good or bad, and this influences their method of performing the work which must be taken into account unless serious errors are to be made. We have had examples of this in France. It has happened that after having modified some signal arrangements with a view to improving the safety of working, we have found it necessary to return to the previous arrangements because it was found that the result obtained was the opposite to that which was expected.

How will the drivers accept signals repeated in the cab of the locomotives? How will they deal with this? Will the safety of working be improved? Experience alone can show. But it is permissible to express some doubt.

What actually takes place on the locomotive? The driver knows that his first duty is to observe the signals and to keep a look-out on the track. This is Article 1 of the regulations. If he does not do this, he runs the risk of causing an accident of which he would be the first victim, and this is a psychological consideration which is of the greatest importance to us.

Its consequence is to make everything subordinate to the observation of the signals and to prevent the driver from doing anything else unless he has made sure that his fireman instead of himself is looking after the road. What will happen as soon as we have put an automatic appliance alongside him? Is it not to be feared, even if he is very conscientious, in fact I would say particularly if he is very conscientious, that he will rapidly come to think that he can cease to watch the track at the same time as his fireman without risk whenever any trouble in the working of the locomotive requires their joint attention?

And would not some drivers even, trusting to the apparatus placed on the locomotive, look out without seeing because they were thinking of something else? The observation of the fixed signals would then depend alone on the working of the apparatus. As to the observation of the movable signals, this would have become quite casual.

I think, therefore, that it is not possible to state that the repeating of the signals will mean progress. Experience will show. I hope that it may be favourable, but I will also say that if our fears are justified, there should be no hesitation in undoing what may have been done.

Mr. Moutier, French Northern Railway. (In French.) — I would ask for your attention for a few minutes as the representative of a railway system which fifty years ago determined to arrange apparatus so that all the signals should be repeated in the cabs of the locomotives.

At the present time there is not a distant signal on the double tracks or on the single tracks which is not fitted with a fixed contact connected to a source of electric power by a circuit that is switched over by the signal. There is not a single

locomotive, except fifteen that are really out of service, that is not fitted with brushes for picking up the current.

The Northern Railway of France, which has applied the system on a very large scale, has not failed to appreciate the psychological aspect of the question to which Mr. Duchatel has alluded. It is, on the other hand, convinced that general repetition of the signals on the locomotives must not be made in such manner that the locomotive driver has nothing to do but to smoke his pipe and keep his hands in his pockets and after a short time forget entirely the responsibility that devolves on him with regard to watching the track.

Consequently, while favouring the repeating of the signals we, who have had long experience, have always before us the leading principle that the apparatus fitted on the locomotives should be as simple as possible with regard to both the number and the nature of the indications given by it. And in this respect, apart from the audible warning, intimating to the driver that he is approaching a signal standing at danger, we have only considered the recording of signals at danger, without making it compulsory.

With regard to the automatic application of the brake, we have discarded this as being of such character as to dull the vigilance of the driver and introducing complications which might make the working of the warning apparatus less reliable; it is necessary that the audible warning should be positive in action and the result will be easier to obtain the simpler the apparatus.

Mr. Maison. (In French.) — Mr. Duchatel has criticized the reasons that I have given in my report explaining how we, in France, have come to consider that the repetition of signals on the locomotives had become almost es-

sential. It was, however, necessary to give these reasons very clearly, because if none of them had existed, the problem would not have been more pressing twenty years ago, than forty or fifty years ago. Now it is certain that in the period preceding the last twenty-five or thirty years this question was not raised and that if, on the other hand, at a later date it has so often attracted the attention of railways and of public bodies, this is for reasons which I have endeavoured to explain.

Our honoured colleague has stated that the increase in speed is not a reason tending to make a driver less careful in observing signals.

I do not share this opinion.

Actually it is quite true that for long past the speed of 120 km. (75 miles) per hour has been allowed in France; on the Northern Railway of France it was already allowed in 1860, but actually this maximum speed was only attained under quite exceptional conditions on down grades. At the present day, by the use of more and more powerful locomotives, sustained speeds of much greater magnitude than formerly are obtained over the whole length of a run and the speeds tend always to increase. Given the magnitude of these sustained speeds, the observation of the signals becomes more and more difficult : when a train runs at a speed of 20 to 30 m. (65.6 to 98.4 feet) per second and the signal is only visible at 200 or 300 m. (220 or 330 yards) it is evident that the driver has less chance of observing the signal than if he were running more slowly. Consequently, any increase in the mean running speed diminishes the time during which the driver can see his signals and it increases the risk there may be of his failing to observe them.

The same applies to the increased

power of the locomotives. This increase has undoubtedly contributed to reducing the conditions of visibility for the driver with regard to the observation of signals. When a driver runs a locomotive that consumes large quantities of fuel and water, the care he must give to such a locomotive requires more attention from him and this increase of care acts detrimentally on the observation of the signals.

It is for these reasons that the fitting of repeating signals in the cabs of the locomotives has become more necessary at the present time. For the last twenty-five years the problem has presented itself in France in an extraordinarily acute form whenever accidents have occurred. Discussions have been very animated and the question has always been regarded in a light favourable to the repetition of the signals on the locomotives.

Mr. Duchatel has also said that the observation of the signal by the driver is the best guarantee for safety. I have also said this, but he added that the driver had a great sense of his responsibility, that moreover he was the first victim in case of accident, and that for both these reasons it might be expected that his attention would be always fixed on the signals, which he would not fail to observe.

I render the greatest homage to the conscientiousness of the drivers in France and in other countries. I am, in fact, convinced that they give their whole attention to the track signals, but it cannot be doubted that this attention may, in some instances, be distracted owing to the need for giving attention to the locomotive.

With regard to the statement that in case of accident the driver is the first victim, this may appear evident at first

sight; but experience has shown that it is not always quite correct. There have been many serious accidents, involving many casualties, out of which the drivers have come unhurt. I do not wish to give figures which might perhaps be taken as a ghastly kind of evidence, but the driver, who is protected by the inertia of a large mass, often escapes the effects of accidents that he has caused.

The consideration of the danger run by the driver must, therefore, be set aside. Moreover, even though this danger were real, it is well known that the worker becomes accustomed to the risk.

It is indisputable that the running of trains at their maximum power and at high sustained mean speeds renders the work of the driver more exacting than ever, and may consequently increase the risks that occur of his failing to observe his signals.

We are far from wishing to say that the observation of the signals is no longer possible at the present day; we only think that it would be ill-considered from the point of view of safety, to fail to take account of innovations which facilitate this observation and may rectify any failure on the part of the driver without dulling his vigilance.

In this respect, Mr. Duchatel has set forth doubts which we all had formerly; but if opinion has finally rallied to the idea that the repetition of signals on the locomotives is necessary, it is because it has appeared to be an essential aid to safety.

Moreover, are the fears expressed by Mr. Duchatel completely justified? I do not think so. Experience has already been gained on the Northern Railway of France where the problem was solved long ago. The « crocodile » has actually been fitted on that railway for more than twenty years and was in regular work

right up to the war. Now, so far as I am aware, the use of this apparatus has not resulted in the attention of the drivers being dulled.

The experience of the Northern Railway of France should therefore inspire confidence in the adoption of such appliances, particularly if they are supplemented by the methods, of which I have spoken, for checking the vigilance of the driver.

In this respect Mr. Moutier has expressed the opinion that these appliances should always be extremely simple in character, so as to be of absolutely certain in action. It is obvious that the guarantee they afford for safety will be the greater, the smaller the number of failures from which they suffer. It is therefore necessary that these appliances should be so devised as to be as reliable as possible. But experience has shown that on some railway systems which have already adopted the arrangement of recording, in combination with a check on the vigilance of the driver, no more failures have taken place than on the Northern Railway of France.

I think that the recording of signals passed at danger may be effected without complicating the working of the apparatus and without increasing the number of failures.

The problem of repeating signals on the locomotives may be approached with confidence because its solution will greatly increase the safety of working of our railways.

Mr. Nitesco, Roumanian State Railway.
(In French.) — In Roumania there are no repeating appliances for signals in the cabs of the locomotives and I do not think they will be adopted in the near future.

Under these circumstances may I assume the position of arbitrator between

Messrs. Maison and Duchatel by proposing that the word « chiefly » should be deleted from the first conclusion.

Mr. Maison. (In French.) — There is no advantage in deleting this word.

Mr. Duchatel. (In French.) — The difference is greater. (*Laughter.*)

Mr. Sabouret, Paris-Orleans Railway. (In French.) — I have a proposition to make which is much more radical than that of Mr. Nitesco.

The object of our meeting is that we may mutually instruct one another and study what is being done elsewhere. We are not legislators, we are mere experimenters. Now on looking over the proposed summary on the question we read :

“ It is to be recommended », « it is desirable that », « it is useful in the interest of safety », « it is necessary, etc. », that is to say we frame a series of rules that actually merely apply to a regulation proposed for a particular country.

You have just heard what is thought of this regulation by the representative of the only company that has put it into force.

We cannot adopt such precise rules, and, if the section does adopt them, the full assembly will not fail to reject them. We might therefore, be content with a conclusion worded as follows : « the question of the repetition of signals in the cabs of locomotives continues to occupy the attention of some Administrations. Many solutions have been tried without it being possible to recommend one in preference to another. »

Mr. Verdeyen, special reporter. (In French.) — The question of the form to be given to the summary has, at the last meeting of the permanent commission, been the subject of an exchange of views,

from which it has arisen that the word « conclusions », hitherto adopted, was badly chosen. It would be better to adopt the term : « summary ».

Actually, if it is not permissible that a Section should accept by a majority of votes one special solution or another, it is necessary that the summary which it submits to the vote of the full assembly should indicate by some phrases the various solutions that have been set forth in the course of the discussion.

On this ground I find that the proposition made by Mr. Sabouret is rather drastic and I think that it would be possible to make a slight modification in the wording of some sentences in the suggested summary based upon the result of our discussion.

The scheme which we have put forward has no other object than that of allowing the work to proceed in such manner that the questions are put in due order : we have, moreover, drawn it up so as to take account of the rather divergent opinions of Messrs. Maison, Villa and myself.

I propose, therefore, that we should keep to this summary, toning down some of the expressions which may, perhaps, have been rather too definite.

Mr. Lamalle, Belgian State Railway. (In French.) — The considerations which form the subject of the summary are too important for us to be able to pass them over in silence. Hence, following the idea of Mr. Sabouret would it not be possible to begin by saying :

“ The repetition of signals in the cabs of locomotives is attracting more and more attention from railway Administrations. On the railway systems which have adopted this method the problem presents itself in the following manner. »

Mr. Pretorian, Roumanian State Rail-

way. (In French.) — Two different opinions have been shown in the course of the discussion, one favourable and the other unfavourable to the repetition of signals in the cabs of locomotives.

Mr. Duchatel is opposed to it for psychological motives which may be of such nature as to cause lack of attention of the driver.

Between these two contrary and irreconcilable opinions there is a third, that of the specialists who are endeavouring to find a solution and who must not lose sight of the fact that there are cases, as for example that of fog, in which it is as essential that the signals should be repeated in the locomotive cab, as in this case the driver has not full opportunity to observe his signals. Now it is a question whether in order to perform this repetition, it is necessary to adopt human intervention or whether mechanical methods can be used.

The question is therefore one of great interest. Under these conditions I think I can join in the proposal of Messrs. Lamalle and Sabouret to begin the summary with a sentence stating that the repetition of signals in the cabs of locomotives continues to occupy the attention of the various railway Administrations.

Sir Herbert A. Walker, London & South Western Railway. — A commission is studying the question. The English Railway Companies are not, at present, prepared to adopt precise conclusions, like those offered by the Reporters.

Mr. Maison. (In French.) — We take the view expressed in the proposal made by Mr. Lamalle : « The repeating of signals in the cabs of locomotives is attracting increasing attention from the railway Administrations. On the railways that have adopted this method, the problem presents itself in the following form. »

This statement would precede our findings which would thus have none of the character of recommendations; they would only give an indication of the present conditions.

Mr. Moutier. (In French.) — In adopting the preamble proposed by Mr. Lamalle it might be possible to make it more definite and at the same time make it more concise without thereby throwing over the principles which have brought it into being, and then word paragraph 2 as follows : « It should be considered only as an aid to safety intended to make the observation of the signals more easy, without necessarily being limited to signals standing at danger. »

This follows from what I said just now. It very often happens that, for subsidiary reasons, parts are added to the fundamental apparatus, which overload it and may tend to prevent its regular working. It is above all necessary that the arrangement of the apparatus which repeats the signals standing at danger should work without any sort of added effort, but I do not mean by this that it is unnecessary to make further investigation in order to say whether its mechanism enables this to be done easily, that is to say without excessive additional complications.

Mr. Maison. (In French.) — It is very difficult to settle at a meeting a text which reflects the idea that the summary does not seem to compel the adoption of any definite arrangement; it is an idea with which the reporters are completely in accord.

It would also appear that they desire that the summary should be more concise. We do not oppose this in the least. Consequently if the Section shares this opinion we may be able to stop here and resume the debate to-morrow morning

on the text that we will prepare this afternoon.

Sir Henry Fowler, Midland Railway, Great Britain. — I should like to know the percentage of failures which occur on the Northern Railway of France; both the percentage which fail to give the correct signal when it should be at danger, and the percentage which fail to give line clear when that should be indicated.

Mr. Maison. (In French.) — I have not the exact statistics of the failures that have occurred with the « crocodile » on the French Northern Railway. If Mr. Moutier were still here he could give them to you. I think I may say, however, that before the war there were only 2 to 4 % of failures. As to how the new appliances will work I do not know at present.

Sir Henry Fowler. — These figures are far too high and would not be tolerated for a moment with ordinary semaphore signals.

Mr. Maison. (In French.) — It is not a question of recommending one apparatus rather than another; it is a question of principle, but it is not impossible to find an apparatus that will give a lower percentage of failures.

However, the Northern Railway of France has found it to work satisfactory on its system, as it has been proved that the arrangement leads to greater safety. After the war it has therefore hastened to re-instal it throughout.

The President. (In French.) — I propose to postpone the remainder of this discussion till to-morrow. (*Agreed.*)

But before closing the meeting we may hear the reading of the summary of the second part of the question.

Mr. Verdeyen, special reporter. (In French.) — The following are the findings :

Recording the running speeds.

« 1° Safety should be the first consideration, and the equipping of all locomotives running on the lines with apparatus which controls the speed can only result in advantage to the railways. To fulfil their object these instruments should be at the same time indicators, that is to say, they should constantly indicate to the driver the speed he is running at, and also recorders, namely, record the working of the train so that it may be possible to reconstruct all the circumstances of the journey;

« 2° The equipment of nearly all the locomotives on the large French Railways with speed indicating and recording apparatus has already been accomplished, and these instruments works satisfactorily for both purposes;

« 3° By the use of indicating and recording apparatus, the companies have generally dispensed with fixed apparatus for ascertaining the speed of engines. This however is still useful in certain circumstances when it may be necessary to measure speed with great accuracy, as the indicating and recording apparatus only registers mean speed during a space of three to twelve seconds and the space run is only given approximately according to the capabilities of the instrument.

« The apparatus is only designed to exercise control by checking the running of trains, and consequently the train and station staffs are in nowise relieved from conforming to all instructions either as regards working or shunting. »

These findings, which are applicable to all the railways in the world, will probably not meet with objection.

The President. (In French.) — We

will examine these to-morrow morning at the same time as the new summary which the reporters will prepare in the meanwhile. (*Accepted.*)

2nd AND 3rd SECTIONS COMBINED.

Meeting held on 27 April 1922 (morning).

Mr. G. BEHRENS, PRESIDENT OF THE 3rd SECTION, IN THE CHAIR.

The President. — Since yesterday Mr. Maison, with his colleagues Messrs. Villa and Verdeyen, have been kind enough to meet the representatives of the English and Italian Governments in order to word the findings in such manner as to be acceptable to everybody.

I now call upon Mr. Maison to speak.

Mr. Maison. (In French.) — The following is the text of the findings that we, together with our English and Italian friends, have the honour to put before you :

« I. — Cab signals.

« The repeating of signals on engines has been attracting the attention of railways more and more.

« On continental railways where the system has been adopted, the present position of the question is as follows :

« 1° The system is in use on lines on which trains run at high speed, and on lines with heavy traffic; it is applied only to those signals which a driver approaches at speed without previous warning;

« 2° The system should be regarded solely as an auxiliary safety measure to assist the observation of fixed signals, and it should be arranged in such a manner as not to impair a driver's vigi-

lance. To ensure this there are grounds for introducing with the system means for checking the vigilance of a driver;

« 3° The apparatus should give an audible warning before a signal in the danger position is reached : on some lines an indication is also given to the driver when the signal is clear.

« The repeating of a fixed signal by means of a visible signal in the cab should only be accepted on condition that it is combined with an audible signal.

« Repeating apparatus are usually combined with instruments for recording when signals are passed in the danger position, and sometimes also when they are passed in the clear position.

« In England, train control is installed on some sections only of the Great Central, the Great Western and the North Eastern Railways.

« The apparatus is only fitted to the distant signals, except on the Great Central, where it is also fitted to the home signals.

« The apparatus fitted to the distant signals partially applies the brake and generally sounds an audible signal which differs according as the signals are « on » or « off ».

« On the Great Central, the apparatus fitted to the home signals causes a full application of the brakes on the train.

“ On the urban lines, such as the Metropolitan and Tubes, a train control apparatus, completely braking the train, is installed at each stop signal.

“ No provision is made for recording the working of the apparatus.

“ The question of train control forms the subject of a Government Commission, whose report is not yet published.

“ II. — *Speed recorders.*

“ 1° It is very desirable to fit all main line engines with speed controlling apparatus. To fulfil this requirement, they should both indicate and record the speed;

“ 2° The use of indicating and recording instruments as a rule renders the use of stationary speed recording apparatus unnecessary, but these may still be of utility at special points on the line where it is desired accurately to determine the speed;

“ 3° The instruments are only used as a check on the running of trains, and should not relieve train crews or station staffs of taking all time records relating to the running of the trains or to the carrying out of shunting operations. »

Not having met any American engineers yesterday afternoon we have arrived at a non-committal text, based on the report of Mr. Villa, which is worded thus :

“ In America the matter is still in an experimental stage. »

Col. J. W. Pringle. — In England we only use a tachometer for experimental purposes and this instrument presents no interest in considering the question of the automatic control of trains.

Mr. Maison. (In French.) — The question which we are now discussing is that of the appliances for repeating signals

in the cabs of locomotives, that is to say, cab-signals. The question of speed-recorders will be taken afterwards. These are problems of two quite different kinds. We have first to express our views on the question of cab-signals.

Mr. Schiavon, Italian State Railway. (In Italian.) — We have decided to discuss first of all the whole proposition put before us by Mr. Maison. But Mr. Duchatel has proposed other findings which must also be examined as a whole. Consequently, before discussing Mr. Maison's proposals in detail, we must take account of the proposals of Mr. Duchatel.

The President. (In French.) — I now call on Mr. Duchatel to speak.

Mr. Duchatel. (In French.) — I have the honour to propose the following resolution :

“ The repeating of signals in the cabs of locomotives continues to occupy the attention of the Administrations.

“ In France, as the result of Government instructions, a general application is in course of execution.

“ In England the question forms the reference of a Committee appointed by the Government, the report of which has not yet been issued.

“ In America and in Italy the matter is still in an experimental stage. »

I think that everybody can agree with this text, which is in no way subversive. (*Laughter of approbation.*)

Mr. Villa, reporter. (In Italian.) — In Italy we have commenced to make experiments with repeating signals in the cabs of locomotives; for this reason I should wish that the addition be made to the proposal of Mr. Duchatel stating that trials are also being made in Italy.

Mr. Nitesco. (In French.) — I think

that the resolution proposed by Mr. Duchatel and the findings of Mr. Maison can go together. It would be sufficient to put Mr. Duchatel's text at the head of our resolution, and then to state what is being done at the present time.

The work of the French Committee may produce results.

Mr. Villa. (In Italian.) — I share completely the opinion of Mr. Nitesco to accept the findings of the Reporter and of Mr. Duchatel.

Mr. Maison. (In French.) — It appears to me that the summary of what is taking place on the various railway systems should be set forth in the deliberations of the Congress. The summary which we put forward is only a resume, set out in a few very simple phrases, of what is being done on the Continent and particularly in France. Consequently I ask the Congress to adhere to our text and not to say that the French Government has required the Companies to instal cab-signals on the locomotives. I do not say that the French Government has not done this; but, actually, that is not a question that concerns the Congress and, on the whole, the railways have agreed entirely with the idea of repeating signals.

I think that it is well that, in the work of the Congress, a statement should be made on this point, as on all those that have been dealt with in the 3rd section. Consequently I ask the Congress to agree with the resolutions which we are setting forth and which mention the actual situation in France and in England. It would be possible to modify the last paragraph so as also to show the situation in Italy and to say: « In Italy as in America, the matter is still in an experimental stage. »

I propose therefore the section should not adopt the motion proposed by

Mr. Duchatel, but that they should give their consent to the summary which we are putting before them.

Mr. Lacoин. Paris-Orleans Railway. (In French.) — I have one observation to put forward with regard to the proposed resolution which has been submitted by Mr. Maison.

This text contains the words: « On those Continental railway systems which have adopted it, the problem presents itself in the following form ... »

I think that this is not in accordance with the actual situation. I can only see the French Railways as having adopted repeating signals or rather as having applied them because they have received instructions to do so. Consequently this phrase does not agree with the actual facts. It is perhaps to be regretted that we should show that there are differences of opinion, but, once more, the Report, in the form in which it has been submitted to us, shows a situation which differs from that which actually exists. It is for this reason that the representatives of the French railways are unable to support this text. I think, therefore, that it will be necessary to take a definite opinion on the selection to be made between the two resolutions which have been submitted to us.

Mr. Schiavon. (In Italian.) — I second the proposal of Mr. Nitesco and do so the more readily in consequence of the speech of Mr. Lacoин. The findings of Mr. Maison have one defect, and that is the defect pointed out by Mr. Lacoин. They do not show which are the railway systems that have actually adopted the method of cab-signalling on locomotives. It is necessary, therefore, to take account in this matter of what Mr. Duchatel has said; that is to say, to mention which are the railway systems of America, of

• England, and of Italy that have adopted the method of cab-signalling. When this has been agreed, it will be possible to discuss the summary of Mr. Maison by hearing the disadvantages and the advantages that have been found on the railway systems on which the method has been adopted. I propose therefore, to combine the two motions and to couple Mr. Duchatel's statement with the statement and the resume of Mr. Maison.

Mr. Maison. (In French.) — I think that it would be possible to accede to the views that have been expressed by amending our text in the sense which has been pointed out.

It has not entered my thoughts to lay down a scheme for French engineers and for the representatives of the French Companies and to say that they had spontaneously accepted the repetition of signals in locomotive cabs. It has appeared to me that it would be mischievous to bring the French Government into an international matter with which it has nothing to do. It would therefore suffice if the phrase were modified thus : « On the Continental railway systems which have adopted it. » To express the thought of Mr. Nitesco and of everyone else it would be sufficient to say : « On the French railway systems where it (the repeating of signals in locomotive cabs) is in use, the problem occurs in the following aspect ... » Finally we should say : « In America and in Italy the matter is still in an experimental stage. »

The findings would then read as follows :

« The repeating of signals in locomotive cabs is more and more occupying the attention of railway Administrations.

« On the French railway systems where it has been applied, the problem presents itself under the following aspect ... »,

etc., ... « In America and in Italy the matter is still in an experimental stage. »

This wording appears to me to reconcile all the opinions that have been set forth.

Mr. Watson, London & North Western Railway, Great Britain. --- The situation in England is about the same as in America and in Italy, that is to say that we are still at the period of trials. The British delegates state that the Government has not made the placing of cab signals on the engines compulsory. It is absolutely necessary to record the fact of the trials in England.

Mr. Baldwin, Illinois Central Railroad. — The position is the same in America as in England. A Commission has endeavoured to put pressure on the railways and to require them to make experiments with repeating cab-signals; but the railways, who have the right of appeal, have refused to do this. A Commission is at the present moment studying the question with representatives of the traction and traffic services of the railways. Its report has not yet been published.

It would be very dangerous to place among the findings the question of repeating signals on the locomotives, because, if there should be a definite resolution in favour of a method of cab-signalling the manufacturers would take advantage of this fact to bring pressure on the railway Administrations and to make the use of certain appliances compulsory by law.

The President. (In French.) — It is a question of knowing whether the continuation of the discussion is to be carried on with regard to the text of Mr. Duchatel or that of Mr. Maison. Once this question has been settled we will continue

the discussion on the one text or the other, which can be amended.

I think I should recall to your minds the resolution proposed by Mr. Duchatel :

“ The repeating of signals in the cabs of locomotives continues to occupy the attention of the Administrations.

“ In France, as the result of Government instructions, a general application is in course of execution.

“ In England the question forms the reference of a Committee appointed by the Government, the report of which has not yet been filed.

“ In America and in Italy the matter is still in an experimental stage.”

Mr. Bochet, Ministry of Public Works, France. (In French.) — It appears to me regrettable that the discussion appeared just now to deal with statements which might be interpreted as a protest against a decision of the French Government. It is in no way the function of the International Congress to make itself a judge of the reservations or protests that this or that concessionary Company may make with regard to a decision of the State on which it depends. Perhaps I have not very clearly grasped Mr. Duchatel's intentions; but, if the discussion should be continued in this sense, I would formally ask that the question should be struck off the agenda.

Mr. Duchatel. (In French.) — I wish to state that the resolutions which I have put forward can in no way have the bearing suggested by Mr. Bochet. I merely wish to show what is being done everywhere. (*Signs of approval from various parts of the assembly.*)

Mr. Pretorian. (In French.) — It appears to me that it is possible to limit ourselves to finding that the question is still in an experimental stage and to ex-

press the hope that it will be investigated at the next Session of the Congress. At that date experiments will have been carried out and it will be possible to draw conclusions from them which will be much more definite than those to which we could come to-day.

Mr. Bochet. (In French.) — I agree with this proposal.

Sir Philip Dawson, London Brighton & South Coast Railway. — The question will continue to be discussed and there will be reports which can be presented at the next session of the Congress.

Mr. Maison. (In French.) — I do not oppose this, but on the contrary agree that the question should be carried forward to the next Congress; but as it has been the object of investigation and reports with a view to the present Session, it appears to me necessary to make a simple statement of the actual situation.

Mr. Duchatel protested just now on his intention to continue to discuss the measures taken by the French Government. The text which we propose would not have the effect of restricting his right to discuss it, because we are confining ourselves to a statement of the position of the question. If a phrase in our resolutions has been capable of being misunderstood we have hastened to modify it so as to express our intention more precisely. It is not actually a question of conclusions, that is to say of statements which may serve as an indication and be quoted in order to be made compulsory on the railway companies, it is merely a question of a simple summary. I propose, therefore, that the Congress should agree to the resolutions which I have drawn up, and I add that the question might be retained on the programme of the next Session. It would be sufficient to modify the first

phrase in such manner as to accentuate that it is a matter of indicating the position. I have said that it was not possible for an International Congress to state that cab-signals have been made compulsory on French railways, because this question does not concern them; but they may take note of the position. Now what is this position? The proposals show:

“ On the French railway systems where it (the repeating of signals in locomotive cabs) is in use, the problem occurs in the following aspect ... ”

As regards England — and here I agree with Colonel Pringle and Sir Henry Fowler — we show that trials are being made, because we say that on the large railways controlling apparatus has not been installed except on some sections of such or such Companies. We could add “ on trial ”.

We can go on to state that in America and in Italy the position is that of a trial period.

Briefly this text appears to me to be such as to reply to the various opinions expressed, because it confines itself to stating the position of the question, and because we have eliminated all individual detail from it.

Mr. Pretorian. (In French.) — I think that the Congress cannot adopt resolutions on a question that has not been thoroughly studied. Those who wish to know what is the present position of the question can refer to the work of the Congress and find out the position on the few railway systems on which repeating cab-signals are in use.

I propose, therefore, that the question be carried forward to the next Session.

Mr. Duchatel. (In French.) — I second the adjournment of the question proposed by Mr. Pretorian. I think with him

that the question is not yet ripe for full discussion.

Mr. Maison. (In French.) — The question, it is true, is not ripe for drawing conclusions; but it is only a question of stating in a summary what is the actual position at the present time.

Mr. Nitesco. (In French.) — This question having formed the subject of a somewhat animated discussion I think it would be well to agree with the findings of Mr. Maison, which are very mild and capable of giving satisfaction to everybody. They only state the position of the question and they avoid any objections. I think that we should thus give satisfaction to the French Government, because the debate has taken rather too lively a form.

Mr. Bachellery, French Midi Railway. (In French.) — I am thoroughly in agreement with Mr. Maison in saying that the resolutions should reflect the actual situation.

But what is the position in France? There is one railway system which has adopted repetition of signals in locomotive cabs for many years : this is the Northern Railway of France. On other railway systems this repetition is actually being applied, but they have not yet had sufficient experience for it to be possible to state what the results are. Consequently the actual situation at the present time is confined to the experience of the Northern Railway of France system. Now it appears to me that the summary put forward by Mr. Maison does not give the position exactly as it exists on the Northern Railway of France. One may be a partisan of a system that checks the vigilance of the driver, but this method is not in use on the Northern Railway of France system. One may be of the

opinion that it is necessary to record signals at line clear as well as signals at danger; but this is not done on the railway system in question. Nor is there a record kept of running past signals standing at danger.

Under these circumstances it appears to me that the findings of Mr. Maison do not show the actual position exactly as it is at present in France.

Mr. Maison. (In French.) — I will not insist upon the adoption of the text exactly as proposed by me. If we take it as the basis of our summary we may amend the various paragraphs in such manner as to render the terms in absolute agreement with the facts such as we believe them to be. In any case, it is the intention of my colleagues and myself to represent the position as it is and not to give particulars.

It is sufficient to read our summary to see that we have come into agreement with the view of Mr. Bachellery and that we have not given particulars either in one sense or in another.

The check on the vigilance of the driver is not in use everywhere according to our colleague. I know this; but we have not said that it was. We have confined ourselves to saying in this respect : « To ensure this there are grounds for introducing with the system means for checking the vigilance of a driver. » Moreover it would also be possible to say : « Some railway systems apply a check on the vigilance of the driver. »

« The repetition » as we say in paragraph 1, « is applied mainly to those lines that are run over by express and fast trains and on those lines carrying heavy traffic, and is only applied to those signals that may be encountered at high speed without the driver having been warned by a distant signal. »

We continue : « 2° The system should be regarded solely as an auxiliary safety measure to assist the observation of fixed signals, and it should be arranged in such a manner as not to impair a driver's vigilance. To ensure this there are grounds for introducing with the system means for checking the vigilance of a driver. »

I am quite willing to say : « Some railway systems have adopted a check on the vigilance of the driver. » Thus we shall not give any indication either for or against because sufficient experience, I recognize, has not yet been gained for it to be possible to show the trend of progress.

We also say : « The apparatus should give an audible warning before a signal in the danger position is reached : on some lines an indication is also given to the driver when the signal is clear. »

This is the case on the Eastern Railway of France and on the French State Railways. Is not this also a simple statement?

Similarly, in agreement with Colonel Pringle, we have stated the situation as it exists in England.

Briefly, I think that if the Congress does not adopt this text it should adopt a summary of the discussion which marks the actual state of the question and which gives no indication susceptible of being used by any Government as a basis for the compulsory use of one method or another on any railway system.

I will read once more the introductory phrase : « On the railway systems where it (the repeating of signals in locomotive cabs) is in use, the problem presents itself in the following form. » We consequently merely state that we are referring to the present condition of

affairs and we make definite statements paragraph by paragraph.

Mr. Bochet. (In French.) — In principle I am quite in agreement with Mr. Maison, and I think that the Congress will find no objection to supporting his proposal provided that some small modifications are made which will make it more definite that it does not deal with advice and formal indications, but is a statement of the actual position. I therefore propose the following text :

“ On the French railways where it is in progress of realization the programme under consideration is the following ... ”

Then I substitute the words « is » and « give » for the expressions « should be », « should give », etc. Thus paragraph 2 becomes « It is simply considered as an aid ... and organized so as to ... »

In paragraph 3, I should say : « The appliances give an audible warning ... ”

“ The repetition of the signal ... is only accepted ... ”

Mr. Watson. — I beg to propose that our conclusions read « The question has been carefully considered by the reporters and members of the 2nd and 3rd sections combined, but it appears that it is impossible to arrive at definite conclusions, because the matter is still in the experimental stage. The results of these experiments may be dealt with at a future Congress. »

The President. (In French.) — The 2nd and 3rd sections not having yet been able to arrive at an exact summary, Mr. Watson has proposed a text which appears to reflect the ideas of the majority of the members present : the referring of the question to another Session.

Mr. Maison. (In French.) — There

must be no misunderstanding. These are not conclusions which we are putting forward, but only a summary of the existing position.

I am entirely in agreement with Colonel Pringle in remarking that it is only a question of trials, because we state that the apparatus is only in actual use on some sections of track in England.

Regarding the text amended by Mr. Bochet it is of such a character as to secure the votes of all, because it gives a still more precise idea of the position of the French railway systems on which the programme is in process of application.

Under these conditions I invite the Section to accept the whole summary as amended.

The President. (In French.) — Let us vote paragraph by paragraph.

Mr. Epinay, secretary. (In French.) — The Chairman proposes that the vote be taken, as they say in the French House, on passage to the discussion of the articles of the summary of the reporters. If the assembly is in agreement the text will then be examined in detail. If it is not in agreement it will accept the counter-proposal of Mr. Watson.

Mr. Schiavon. (In Italian.) — It is necessary to put the amendment to the vote first and afterwards proceed to the discussion of the articles.

Mr. Lanino, Ministry of Public Works, Italy. (In French.) — I ask that according to the normal rules of parliamentary discussion the amendment be put to the vote first. This is, moreover, the method of procedure in Parliament.

Mr. Epinay. (In French.) — I much regret that I should have alluded just now to parliamentary usage. But as a delegate has required its application it

will be necessary for us to vote in the first instance on the question of taking notice of the counter-proposal. (*Laughter.*)

Mr. Bochet. (In French.) — It would be unfortunate if the Section should confine itself to deferring the examination of this question to another Session without giving a statement of the present position. This statement would actually afford valuable information to those who might consult the documents.

Under these conditions, I understand the proposal of our honoured colleague to be an addition to the text of Mr. Maison in the sense that he will refer the two questions to another Session to become the subject of a more complete investigation.

The President. (In French.) — As no one else desires to speak I will put the first paragraph of the summary to the vote : « 1^o The question has been carefully considered by the reporters and members of the 2nd and 3rd sections combined, but it appears that it is impossible to arrive at definite conclusions, because the matter is still in the experimental stage. The results of these experiments may be dealt with at a future Congress. »

— Adopted.

The President. (In French.) — We now go on to paragraph 2 concerning the recording of speeds.

Mr. Maison. (In French.) — When speed recording apparatus was installed some persons thought that this arrangement might save the employees from keeping records of the times at which trains passed by certain points, because these particulars could always be obtained from the record strip.

It was our idea that the recording of speeds should never supersede the noting,

by the employees of the times, of stoppages in the stations.

Mr. Nitesco. (In French.) — I propose to delete paragraph 3 of the findings.

The President. (In French.) — Colonel Pringle has stated that in England experiments have been carried out with these appliances, but they do not wish to apply them generally.

Mr. Schiavon. (In Italian.) — To reconcile the proposal of Mr. Maison with that of Mr. Nitesco I propose to retain the third paragraph, but to delete the last three lines making the finding end in the words « trains ». All the rest is quite unnecessary.

Mr. Maison. (In French.) — These appliances are only fitted to exercise a check by trial on the trains, but it appeared to us that there was some advantage in making a precise statement that it was not possible to relieve the employees of the duty of keeping notes of all the particulars which are required of them.

Mr. Nitesco. (In French.) — It is unnecessary to say this here.

Mr. Maison. (In French.) — As we are in the way of eliminations I do not oppose the adoption of as simple a summary as possible.

I should add that in France we are no longer in the experimental period, for the matter has been a practical one since 1906. It would be well, therefore, to state this fact by saying : « In France, speed-recording appliances are in regular use. »

Mr. Schiavon. (In French.) — We will accept the text as proposed, but we think

that it is useless to add that the appliances do not save the station or train employees from taking all notes relative to the times at which the trains pass, or shunting operations are performed.

The President. (In French.) — The English and American railways do not use these appliances and it will be necessary to mention the fact.

Mr. Maison. (In French.) — One might add : « These instruments are not used in Britain or America. » Thus we shall confine ourselves to a statement.

The President. (In French.) — The final text will therefore be as follows :

« 2° The use of instruments for indicating and recording the speed is very general on the continent.

« The use of these instruments as a

rule allows the railways to dispense with stationary instruments for measuring the speed of engines, but these may still be useful at certain points where it is necessary to determine the speed in an accurate manner.

« The instruments are only used as a check in the running of trains.

« These instruments are not used in Britain or America. »

— Adopted.

Mr. Schiavon. (In French.) — Before we separate I think it only right to thank the Chairman for the manner in which he has presided over our discussion. (*Applause.*)

The President. (In French.) — I thank you, Gentlemen, for this mark of sympathy which applies equally to all my collaborators. (*Renewed applause.*)

DISCUSSION AT THE GENERAL MEETING

Meeting held on 28 April 1922 (morning).

Mr. R. de CORNÉ, HONORARY VICE-PRESIDENT, IN THE CHAIR.

GENERAL SECRETARIES : Mr. J. VERDEYEN ; Mr. E. FRANZA ; Sir HENRY FOWLER.

ASSISTANT GENERAL SECRETARY : Mr. N. GIOVENE.

Sir Henry Fowler, general secretary, read the

Joint report of the 2nd and 3rd sections.

(See *Daily Journal of the session*, No. 6, p. 12, No. 8, p. 9 and No. 9, p. 9.)

« THE PRESIDENT drew attention to the following resume proposed by the three reporters, MESSRS. MAISON, VILLA and VERDEYEN, dealing with the first part of the question relative to cab signals :

« 1° The repetition of signals on locomotives is used at the present day chiefly for fast and express trains and for the heavy freight trains;

« 2° Repeating the signals must be considered solely as an adjunct to the safety measures intended to make the observation of signals easier; in no case can it be a question of substituting this system of signals for the track signals, the direct observation of which by the driver will always remain the greatest guarantee for safety;

“ 3° The repetition of signals should be arranged in such a manner as not to dull the attention of the driver, and with this object, the apparatus should at the same time as it conveys a warning to the driver that the signal he is approaching is at danger, record his passing this signal. The record should be made in such a manner that the exact position of the signals passed is recorded, and with this object it is necessary to reproduce it on the tape of the speed recorder. Warning should only be given to the driver for signals standing at danger, but it may be of advantage also to record the signals standing at line clear, distinguishing these from those at danger, and to bring their passing to the notice of the engine driver by means of an audible signal that can only be heard on the footplate.

“ In addition, it is advisable, with a view to safety, to establish a check on the vigilance of the driver by obliging him to operate a quick and simple recording device when he sees a signal at danger;

“ 4° The repeating of signals should only be applied to signals which are met at a high speed without any preceding signal to warn the driver;

“ 5° Warning should be given to the driver by an audible signal, distinct as far as possible from the ordinary locomotive whistle, and loud enough to be heard not only by the driver, but also by others of the train crew. Repeating the signal by the indication of a visual disc in the locomotive cab does not commend itself and can only be allowed if it is accompanied by the audible signal;

“ 6° It is not advisable for the apparatus to act on the brakes of the train and thus cause an automatic stop, even though the driver could prevent this action taking place;

“ 7° By reason of the necessity for re-

gistering the position of the signals that have been passed, it is necessary to arrange the track contacts, which should operate the warning and recording appliances when the locomotive runs over them actually at the signal itself or only a few yards in advance of the signal, in such a manner that there may be absolute agreement between the recording tape and the position of the signal seen by the driver at the moment that he was passing it;

“ 8° The repeating of signals in the cabs of locomotives may be carried out by electrically or purely mechanically driven apparatus. In France the crocodile type of apparatus is preferred, and it is capable of application to single lines without difficulty. It can also be applied equally well to electrified lines.

“ Mr. MAISON (*French Government*) reviewed the whole subject. He stated in the first place that there were two separate parts of the question : 1° The repetition of signals upon locomotives; 2° The recording of speed. These two points were the object of separate investigations and conclusions on the part of the reporters and ought to be considered separately by the section.

“ As regards the repetition of signals upon engines, Mr. Maison gave an account of its development in France, and expressed the opinion that the number of accidents which had occurred had led the public to recognise the necessity of repeating the signals.

“ Mr. Maison drew the attention of the section to the three principal points :

“ a) Should signals in the “ off ” or “ clear ” position be repeated?

“ b) Are automatic train stops advisable?

“ c) Should there be a visible signal in the engine cab ?

“ Mr. Maison was of the opinion that the repetition of signals in the “ off ” position, if adopted, should be arranged so as to be quite distinct from the repetition of danger signals, and in such a way as not to disturb the attention of the driver. He also thought that an automatic train stop was difficult to arrange, because of the different speeds of various trains running on the same line; yet at the present time, systems including the automatic stop were being accepted in France for investigation and experiment, though these apparatus were rejected without being examined twenty years ago. The visible signal in the cab did not appear to him to be desirable, because the driver should watch the signals along the line and not those in his cab.

“ Mr. Maison also explained that in France, all warning signals and all distant signals (red discs) would be repeated on main lines and on other lines making junction with main lines, both for single and double lines. The equipment of the lines and engines will be completed by 1 July 1924.

“ Col. J. W. PRINGLE (*British Government*) stated he had been the president of a commission appointed to examine this question in the United Kingdom, and this commission considered that of all the serious accidents occurring in Britain in the space of ten years, more than one third would have been avoided by the repetition of distant signals, and more than one sixth by the repetition of stop signals.

“ He thought therefore that repeating devices are desirable for distant signals and for certain stop signals, but in the United Kingdom only in the case of double lines. As regards single lines, the existing safety devices are quite sufficient.

“ Mr. DUCHATEL (*French Eastern*) said

that he shared in the astonishment and disagreement which some of the opinions expressed in Mr. Maison’s report had given rise to among the locomotive engineers of the French railways. He could not let pass without protest a report from which one might be led to conclude that the observation of signals on the part of the driver was difficult, or their disregard excusable. In view of the acceleration of trains and the increase in the length of the boiler barrel, the French railways had not neglected this subject. They were giving great attention to improving the visibility of signals from the footplate. For the same reason they were again arranging for engines to be driven from the left hand side. The siting of the fixed signals had been revised, and where necessary, auxiliary signals provided to give warning that the principal signal was being approached.

“ Coming to the rest of the question, Mr. Duchatel considered that it is not proved that the repetition of signals upon locomotives would lead to an increase in safety. Besides considering rules and regulations, the psychological factor must be taken into account. Is it really thought that a driver will pay as much attention to the wayside signals, if these are repeated in the cab? One must compare the present failures of a driver who relies solely on his eyesight with the future failures arising both from the driver and also from the apparatus when the former is dependent on the latter. In which is the greater safety?

“ Mr. Duchatel thought that only experience could prove this point, and he should hope that there would be no cause to regret the measures which are about to be adopted on the French railways.

“ Mr. MOUTIER (*French Northern*) insisted on the necessity of a simple appar-

atus, to avoid as far as possible any failures in working which might be caused by the addition of accessory fittings, and was emphatic as regards the serious objections which would certainly arise, both as regards the rolling stock and also from a psychological point of view, if the brake were to be automatically applied.

« Mr. MAISON contested the view taken by Mr. Duchatel, and emphasised the increase in the average running speed of trains during the last twenty years and the much greater amount of attention required in driving modern locomotives.

« Mr. Maisoñ drew attention to the fact that the « crocodile » has been in use on the French Northern for twenty years, and it cannot be truly said that the use of this apparatus on this railway has resulted in making the drivers less vigilant.

« Mr. SABOURET (*Paris-Orleans*) remarked that the conclusions proposed by the reporters referred mainly to the investigations of the French administrations, and it did not seem quite satisfactory that the Congress should assent to the generalisation of a system which has not been proved in actual practice.

« After a discussion in which Messrs. NITESCO and PRETORIAN (*Roumanian State*), VERDEYEN (*reporter*), Sir HERBERT A. WALKER (*London & South Western*), Sir HENRY FOWLER (*Midland Railway*), MOUTIER and LAMALLE (*Belgian State*) took part, it was decided that new and less rigid deductions should be prepared by the reporters.

« Mr. MAISON read the amended text, which was put to the section :

« I. — *Cab signals.*

« The repeating of signals on engines has been attracting the attention of railways more and more.

« On continental railways where the system has been adopted, the present position of the question is as follows :

« 1° The system is in use on lines on which trains run at high speed, and on lines with heavy traffic; it is applied only to those signals which a driver approaches at speed without previous warning;

« 2° The system should be regarded solely as an auxiliary safety measure to assist the observation of fixed signals, and it should be arranged in such a manner as not to impair a driver's vigilance. To ensure this there are grounds for introducing with the system means for checking the vigilance of a driver;

« 3° The apparatus should give an audible warning before a signal in the danger position is reached : on some lines an indication is also given to the driver when the signal is clear.

« The repeating of a fixed signal by means of a visible signal in the cab should only be accepted on condition that it is combined with an audible signal.

« Repeating apparatus are usually combined with instruments for recording when signals are passed in the danger position, and sometimes also when they are passed in the clear position.

« In England, train control is installed on some sections only of the Great Central, the Great Western and the North Eastern Railways.

« The apparatus is only fitted to the distant signals, except on the Great Central, where it is also fitted to the home signals.

« The apparatus fitted to the distant signals partially applies the brake and generally sounds an audible signal which differs according as the signals are « on » or « off ».

“ On the Great Central, the apparatus fitted to the home signals causes a full application of the brakes on the train.

“ On the urban lines, such as the Metropolitan and Tubes, a train control apparatus, completely braking the train, is installed at each stop signal.

“ No provision is made for recording the working of the apparatus.

“ The question of train control forms the subject of a Government Commission, whose report is not yet published.

“ II. — Speed recorders.

“ 1° It is very desirable to fit all main line engines with speed controlling apparatus. To fulfil this requirement, they should both indicate and record the speed;

“ 2° The use of indicating and recording instruments as a rule renders the use of stationary speed recording apparatus unnecessary, but these may still be of utility at special points on the line where it is desired accurately to determine the speed;

“ 3° The instruments are only used as a check on the running of trains, and should not relieve train crews or station staffs of taking all time records relating to the running of the trains or to the carrying out of shunting operations.

“ This summary gave rise to a discussion in which Messrs. MAISON, DUCHATEL, VILLA and SCHIAVON (*Italian State*), NITESCO, BALDWIN (*Illinois Central Railroad*), LACOIN (*Paris-Orléans*), A. WATSON (*London & North Western*), BOCHET (*French Government*), PRETORIAN, BACHELLERY (*French Midi*) took part.

“ As a consequence of this discus-

sion, Mr. WATSON, who was supported by Mr. PRETORIAN, moved an amendment to the first part, which was adopted.

“ As regards the speed indicators and recorders; after a statement by Colonel J. W. PRINGLE that these instruments are not used in Britain, except for experimental work, and that there is no intention of using these for every day service, and a discussion in which Messrs. SCHIAVON, NITESCO, LACOIN and MAISON took part, the following text was agreed to for submission to the general meeting. »

The President. — This is the

Final summary.

“ 1° The question has been carefully considered by the reporters and members of the 2nd and 3rd sections combined, but it appears that it is impossible to arrive at definite conclusions, because the matter is still in the experimental stage. The results of these experiments may be dealt with at a future Congress;

“ 2° The use of instruments for indicating and recording the speed is very general on the continent.

“ The use of these instruments as a rule allows the railways to dispense with stationary instruments for measuring the speed of engines, but these may still be useful at certain points where it is necessary to determine the speed in an accurate manner.

“ The instruments are only used as a check in the running of trains.

“ These instruments are not used in Britain or America. »

— The general meeting ratified this summary.

Corrigenda

to report No. 3 on question XII (Locomotive cab signals), by F. Villa

Page 827 of the *Bulletin* of May-June 1922 (question XII, page 117 of *red covered book* No. 65), 1st column, 15th and 16th lines, *in place of* : "the treadle that shows 'line clear' is in the centre of the track", *read* : "the treadle which shows 'line clear' is also in the same position."

Page 827 of the *Bulletin* (question XII, page 117 of *red covered book*). 1st column, lines 24, 25, 26, 27, 28 and 29, *in place of* : "the right hand one by any treadle standing at the position corresponding to 'line clear', and the left-hand by a treadle corresponding in position to a home signal standing at 'danger',", *read* : "the left-hand one by any treadle standing in the position corresponding to 'line clear', and the right-hand by a treadle corresponding in position to a home signal standing at 'danger',".

Page 842 of the *Bulletin* (question XII, page 132 of the *red covered book*), 2nd column, the following should be inserted : "With regard to the Perry-Prentice apparatus, it should be noted that the 'London & South Western Railway', have abandoned the experiments to which they referred in reply to the questionnaire, and we are advised that the working of the apparatus was not satisfactory, and it has been thought desirable to entirely abandon the experiment for the present".

Page 848 of the *Bulletin* (question XII, page 138 of the *red covered book*), 1st column, 2nd paragraph, *in place of* : "The future alone will show by the frequency for which it has been adjusted", *read* : "Several inventors have experimented with very sensitive relay types of wave detectors in which considerable ingenuity has been shewn. Amongst them one may mention Messrs. Kapp and Kramer, inventors of the system known under the name of the 'Railophone', the essential and original part of which consists of a very sensitive KK relay constructed in such a manner as to be affected only by the frequency for which it has been adjusted. The future alone, however, can show if the work of Messrs. Kapp and Kramer will enable this very difficult problem of the repetition of signals to be solved in a really practical manner."
